FUJITSU

SPARC Enterprise
M3000 Server

Service Manual

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FUJITSU

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Preface

This manual describes how to service SPARC Enterprise™ M3000 server. It is written for maintenance providers who have received training under a self-maintenance contract.

This section includes:

- "Glossary" on page xiii
- "Structure and Contents of This Manual" on page xiv
- "M3000 Server Documentation" on page xv
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- "Fujitsu Welcomes Your Comments" on page xxviii

Glossary

For the terms used in the "M3000 Server Documentation" on page xv, refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary*.

Structure and Contents of This Manual

This manual is organized as described below:

- CHAPTER 1 Safety Precautions for Maintenance

  Provides safety precautions required for maintenance.
- CHAPTER 2 Hardware Overview

  Explains the names of components and also explains the LEDs on the operator panel and rear panel.
- CHAPTER 3 Troubleshooting

  Explains fault diagnosis information.
- CHAPTER 4 FRU Replacement Preparation

  Explains the method of preparing for the safe replacement of FRUs.
- CHAPTER 5 Internal Components Access

  Explains how to access internal components.
- CHAPTER 6 Motherboard Unit Replacement

  Explains how to replace the motherboard unit.
- CHAPTER 7 Replacement and Installation of Memory

  Explains how to replace and install memory (DIMMs).
- CHAPTER 8 Replacement and Installation of PCIe Cards

  Explains how to replace and install PCIe cards.
- CHAPTER 9 Replacement and Installation of a Hard Disk Drive (HDD)

  Explains how to replace and install hard disk drive.
- CHAPTER 10 Replacing the Hard Disk Drive Backplane

  Explains how to replace the hard disk drive backplane.
- CHAPTER 11 CD-RW/DVD-RW Drive Unit (DVDU) Replacement

  Explains how to replace the CD-RW/DVD-RW drive unit.
- CHAPTER 12 Power Supply Unit Replacement

  Explains how to replace a power supply unit.
- CHAPTER 13 Fan Unit Replacement

  Explains how to replace a fan unit.

- CHAPTER 14 Fan Backplane Replacement

  Explains how to replace the fan backplane.
- CHAPTER 15 Operator Panel Replacement

  Explains how to replace the operator panel.
- APPENDIX A Components List

  Explains the server nomenclature and component numbering.
- APPENDIX B FRU List

  Explains FRUs.
- APPENDIX C External Interface Specifications

  Explains connector specifications for external interfaces.
- APPENDIX D UPS Controller

  Explains the UPS controller (UPC) that controls the uninterruptible power supply (UPS) unit.
- APPENDIX E DC Power Supply Model

  Describes the requirements specific to the DC power supply model.
- Abbreviations

  Provides the full spellings of abbreviations used in this manual.
- Index

  Provides keywords and corresponding reference page numbers so that the reader can easily search for items in this manual as necessary.

M3000 Server Documentation

The manuals listed below are provided for reference.

Book titles	Manual codes
SPARC Enterprise M3000 Server Site Planning Guide	C120-H030
SPARC Enterprise Equipment Rack Mounting Guide	C120-H016
SPARC Enterprise M3000 Server Getting Started Guide	C120-E536
SPARC Enterprise M3000 Server Overview Guide	C120-E537
Important Safety Information for Hardware Systems	C120-E391
SPARC Enterprise M3000 Server Safety and Compliance Guide	C120-E538

Book titles	Manual codes
SPARC Enterprise M3000 Server Installation Guide	C120-E539
SPARC Enterprise M3000 Server Service Manual	C120-E540
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure	C120-E361
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide	C120-E331
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	C120-E332
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual	Go to the Web
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide	C120-E360
SPARC Enterprise M3000 Server Product Notes	Go to the Web
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary	C120-E514
SPARC Enterprise /PRIMEQUEST Common Installation Planning Manual	C120-H007

1. Manuals on the web

   The latest versions of all the SPARC Enterprise Series manuals are available at the following websites.

   Global Site

   http://www.fujitsu.com/sparcenterprise/manual/

   Japanese Site

   http://primeserver.fujitsu.com/sparcenterprise/manual/

Note – SPARC Enterprise M3000 Server Product Notes are available on the website only. Please check for the most recent update on your product.

2. Documentation CD

   For the Documentation CD, please contact your local sales representative.

   - SPARC Enterprise M3000 Server Documentation CD (C120-E541)

3. Manual on the Enhanced Support Facility x.x CD-ROM disk
   - Remote maintenance service

Book title	Manual code
Enhanced Support Facility User's Guide for REMCS	C112-B067

4. Manual (man page) provided in system

   XSCF man page

Note – The man page can be referenced on the XSCF Shell, and it provides the same content as the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

5. Sun Microsystems software (for Solaris OS, etc.) related manuals

   http://docs.sun.com

6. Information on using the RCI function

   The manual does not contain an explanation of the RCI build procedure. For information on using the RCI function, refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure* and *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide* provided on the website.

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Fonts/symbols	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font represents the example of command input in the frame.	XSCF> **adduser jsmith**
AaBbCc123	The names of commands, files, and directories; on-screen computer output. This font represents the example of command output in the frame.	XSCF> **showuser -p** User Name: jsmith Privileges: useradm auditadm
Italic	Indicates the name of a reference manual	See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*
" "	Indicates names of chapters, sections, items, buttons, or menus	See Chapter 2, "Hardware Overview."

Prompt Notations

The following prompt notations are used in this manual.

Shell	Prompt notations
XSCF	XSCF>
C shell	machine-name%
C shell super user	machine-name#
Bourne shell and Korn shell	$
Bourne shell and Korn shell super user	#
OpenBoot™ PROM	ok

Syntax of the Command-Line Interface (CLI)

The command syntax is as follows:

- A variable that requires input of a value must be enclosed in <>.
- An optional element must be enclosed in [ ].
- A group of options for an optional keyword must be enclosed in [ ] and delimited by |.
- A group of options for a mandatory keyword must be enclosed in {} and delimited by |.
- The command syntax is shown in a box.

Example:

```
XSCF> showuser -a
```

Environment Requirements for Using This Product

This product is a computer that is intended to be used in a data center. For details of the system requirements, refer to *SPARC Enterprise M3000 Server Installation Guide*.

Conventions for Alert Messages

This manual uses the following conventions to show alert messages, which are intended to prevent injury to the user or bystanders as well as property damage, and important messages that are useful to the user.

WARNING:
This indicates a hazardous situation that could result in death or serious personal injury (potential hazard) if the user does not perform the procedure correctly.

CAUTION:
This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

IMPORTANT:
This indicates information that could help the user to use the product more effectively.

Alert messages in the text

An alert message in the text consists of a signal indicating an alert level followed by an alert statement. Alert messages are indented to distinguish them from regular text. Also, a space of one line precedes and follows an alert statement.

WARNING:
The tasks listed below for this product and optional product provided by Fujitsu Computers should be performed only by field engineer.

The user must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components
- Removal of front panel and top cover
- Mounting/unmounting of optional internal devices
- Connecting/disconnecting of external interface cables
- Maintenance (repair and regular diagnosis and maintenance)

Also, important alert messages are shown in "Important Alert Messages" on page xxi.

Notes on Safety

Important Alert Messages

This manual provides the following important alert signals:

Caution – The WARNING signal indicates a dangerous situation could result in death or serious injury if the user does not perform the procedure correctly.

Task	Warning
Normal operation	**Electric shock, fire** Do not damage, break, or modify the power cords. Cord damage may cause electric shock or fire.
Emergency	**Smoking or fire** If smoke or fire is generated from the server, press down the power switch for 4 seconds or more, power off the server, and then remove the cord clamp and disconnect the power cord.

Caution – The CAUTION signal indicates a hazardous situation could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Task	Warning
Normal operation	**Equipment damage** Be sure to follow the precautions below when installing the main unit. Otherwise, the equipment may be damaged. • Do not block ventilation slits. • Avoid installing the equipment in a place exposed to direct sunlight or near devices that becomes extremely hot. • Avoid installing the equipment in a dusty place or a place directly exposed to corrosive gas or salty air. • Avoid installing the equipment in a place exposed to strong vibration. Also, install the equipment on a level surface so that it is stable. • The grounding resistance must not be greater than 10 Ω. The grounding method varies by the building where you install the server. Make sure that the facility administrator or a qualified electrician verifies the grounding method for the building and performs the grounding work. • Do not run any cable beneath any equipment. Also, prevent cables from becoming taut. Never disconnect any power cord from the equipment while power is being supplied to the equipment. • Do not place anything on top of the main unit. Do not use the main unit as a workspace. • Avoid exposing the equipment to rapid changes in the ambient temperature, such as a rapid increase during transport in winter. A rapid increase in the ambient temperature causes moisture to condense in the equipment. Use the equipment only after the difference between its temperature and the ambient temperature is negligible. • Avoid installing the equipment near a copy machine, air conditioner, welding machine, or any other devices generating electronic noise. • Take preventive action to minimize static electricity at the installation location. Note that static electricity is easily generated in some carpets and can cause the equipment to malfunction. • Confirm that the power supply voltage and frequency during operation match the rated values indicated on the equipment. • Do not insert any object into an opening in the equipment. Components inside the equipment use high voltage. Conductive foreign matter, such as a metal object, inserted into the equipment, may cause a short circuit between components, resulting in fire, electric shock, or equipment damage. • For maintenance of the equipment, contact your authorized service personnel.

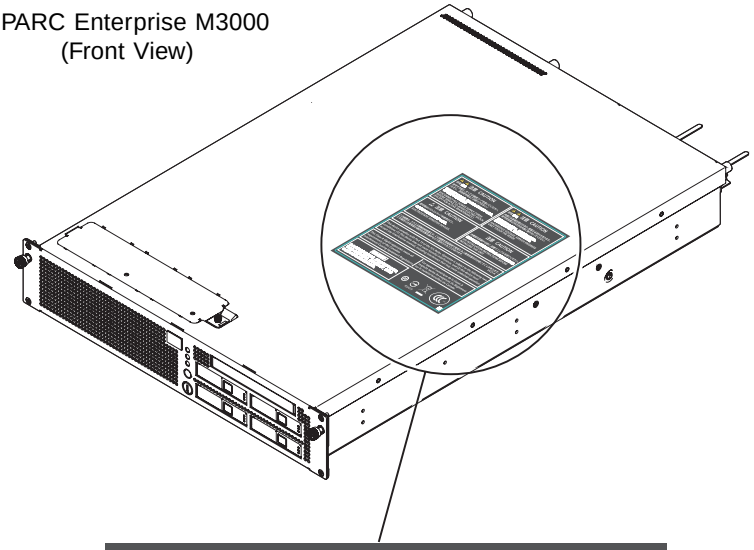
Task	Warning
Normal operation	**Data destruction** Confirm the items listed below before turning off the power. Otherwise, data may be destroyed. • All applications have completed processing. • No user is using the equipment. • When the main unit power is turned off, the POWER LED on the operation panel is turned off. Be sure to confirm that the POWER LED is off before turning off the main power (uninterruptible power supply [UPS], power input, etc.). If necessary, back up files before turning off the system power. **Data destruction** Do not forcibly stop a domain that is operating normally. Otherwise, data may be destroyed. **Data destruction** Do not disconnect the power cord from the power input while power is being supplied. Otherwise, data stored on hard disk units may be destroyed.
Maintenance	**Failure** Unpacking and maintenance of this equipment and Fujitsu optional products must always be performed by a certified field engineer. Customer shall never perform this work by themselves, as this could lead to failures. **Equipment damage** When handling parts, be sure to wear an antistatic wrist strap and connect the clip to the grounding port of the server. Place removed parts on an antistatic conductive mat. Failure to do so may result in serious damage or injury. **Electric shock** Before doing the maintenance, unplug the power cords. This product uses double pole/neutral fusing which could create an electric shock hazard.

Alert Labels

The following are labels attached to this product:

Caution – Never peel off the labels.

SPARC Enterprise M3000
(Front View)



注意 CAUTION
感電 触电
保守する前に、すべての電源コードを抜いてください。
(ただし、活性保守時はこの限りではない。)
在进行维护工作之前,请从插座上拔掉所有电源线。
(带电维护不在此范围内)
DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICE TO AVOID ELECTRIC SHOCK.
(EXCEPT FOR ACTIVE MAINTENANCE.)
注意 CAUTION
感電 触电
内部には高電圧部分があり、感電する恐れがあります。
保守担当者以外の方は内部に触れないでください。
装置内有高电压部分,有引起触电的危险。
除保养担当者之外,请勿触摸装置内部。
HAZARDOUS VOLTAGE. SERVICE ENGINEER ONLY TOUCH THE INSIDE.
注意 CAUTION
保守時はリストストラップを着用のこと。
维护保养时必须佩带防静电腕带。
ELECTROSTATIC SENSITIVE DEVICES.
注意 CAUTION
本機器を搭載する前に、設置マニュアルを見てください。
请务必先阅读本装置安装手册之后,再进行机器的安装。
SEE INSTALLATION INSTRUCTIONS BEFORE INSTALLING THIS UNIT.
この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。
この場合には使用者が適切な対策を講ずるよう要求されることがあります。
VCCI-A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.
警告使用者:
此為甲類資訊技術設備,於居住環境中使用時,可能會造成射頻擾動,在此種情況下,使用者會被要求採取某些適當的對策。
R33073

Product Handling

Maintenance

Caution – Certain tasks in this manual should only be performed by a certified service engineer. User must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components, and initial settings
- Removal of front panel and top cover
- Mounting/de-mounting of optional internal devices
- Plugging or unplugging of external interface cards
- Maintenance and inspections (repairing, and regular diagnosis and maintenance)

Caution – The following tasks regarding this product and the optional products provided from Fujitsu should only be performed by a certified service engineer. Users must not perform these tasks. Incorrect operation of these tasks may cause malfunction.

- Unpacking optional adapters and such packages delivered to the users
- Plugging or unplugging of external interface cards

Remodeling/Rebuilding

Caution – Any modification and/or recycling of this product and its components may be carried out only by a certified service engineer and must not be done by the customer under any circumstances. Otherwise, electric shock, injury or fire may result.

Emission of Laser Beam (Invisible)

Caution – The server contains modules that generate invisible laser radiation. Laser beams are generated while the equipment is operating, even if an optical cable is disconnected or a cover is removed. Do not look at any laser light source directly or through an optical apparatus (e.g., magnifying glass, microscope).

Limitations and Cautions

Power Control and Operator Panel Mode Switch

When you use the remote power control utilizing the RCI function or the automatic power control system (referred to below as APCS), you can disable this remote power control or the APCS by switching to Service mode on the operator panel.

Disabling these features ensures that you do not unintentionally switch the system power on or off during maintenance. Note system power off with the APCS cannot be disabled with the mode switch. Therefore, be sure to turn off automatic power control via APCS before starting maintenance.

If you switch the mode while using the RCI or the automatic power control, the system power is controlled as follows.

Function	Mode switch	
	Locked	Service
RCI	Remote power-on/power-off operations are enabled.	Remote power-on/power-off operations are disabled.
Automatic power control	Automatic power-on/power-off operations are enabled.	Automatic power-on is disabled, but power-off remains enabled.

To use the RCI function, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure* and the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide* which are available on the website of manuals.

To use the APCS, see the *Enhanced Support Facility User's Guide for Machine Administration Automatic Power Control Function (Supplement Edition)*.

Fujitsu Welcomes Your Comments

If you have any comments or requests regarding this document or if you find any unclear statements in the document, please state your points specifically on the form at the following URL.

For Users in U.S.A., Canada, and Mexico:

http://www.computers.us.fujitsu.com/www/support_servers.shtml?support/servers

For Users in Other Countries:
SPARC Enterprise contact

http://www.fujitsu.com/global/contact/computing/sparce_index.html

CHAPTER 1

Safety Precautions for Maintenance

This chapter provides safety precautions required for maintenance.

- Section 1.1, "ESD Precautions" on page 1-1
- Section 1.2, "Server Precautions" on page 1-3

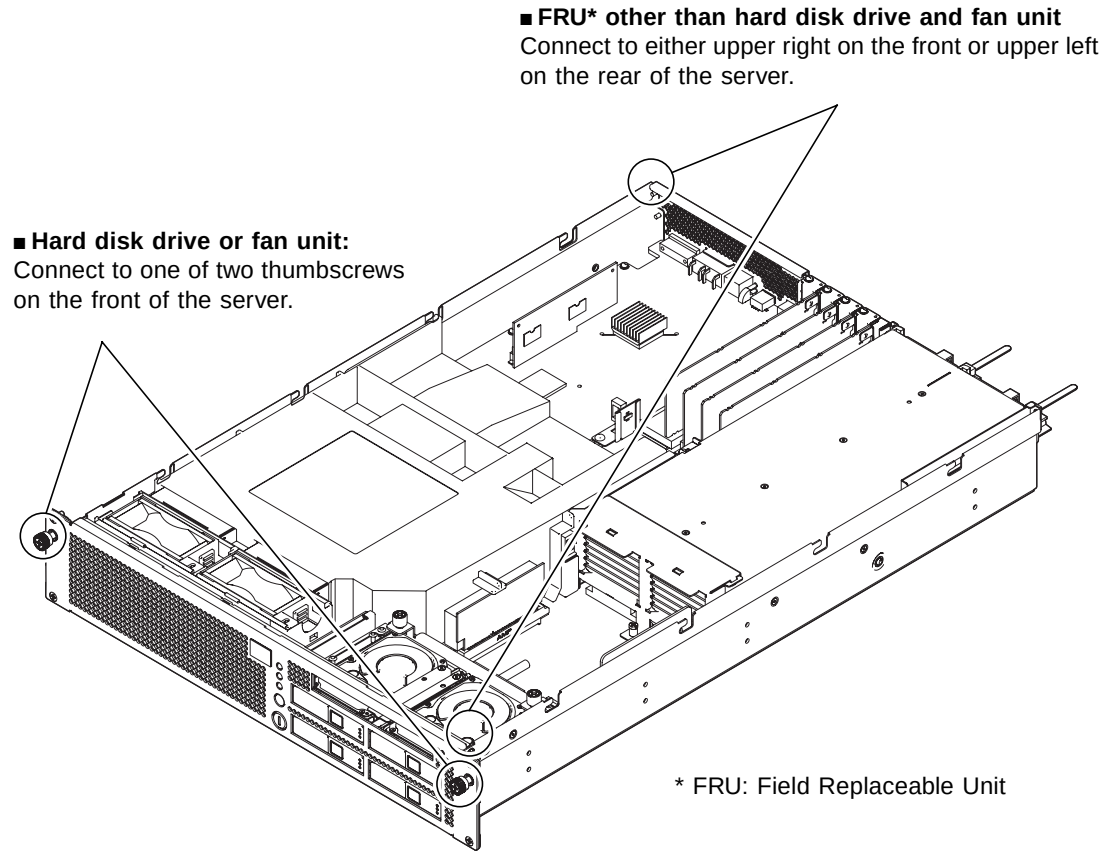
1.1 ESD Precautions

To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the following safety precautions.

TABLE 1-1 ESD Precautions

Item	Precaution
ESD connector/wrist strap	Connect the ESD connector to your server and wear the antistatic wrist strap when handling printed circuit boards. See FIGURE 1-1, for the wrist strap connection destination.
Conductive mat	An approved conductive mat provides protection from static damage when used with a wrist strap. The mat also cushions and protects small parts that are attached to printed circuit boards.
ESD safe packaging box	Place a printed board or component in the ESD safe packaging box after you remove it.

FIGURE 1-1 Wrist Strap Connection Destination


■ FRU* other than hard disk drive and fan unit
Connect to either upper right on the front or upper left on the rear of the server.
■ Hard disk drive or fan unit:
Connect to one of two thumbscrews on the front of the server.
* FRU: Field Replaceable Unit

Caution – Do not connect the wrist strap cable to the conductive mat. Connect it directly to the server.

The wrist strap and FRU must have the same level of potential.

1.2 Server Precautions

When maintaining the server, observe the following precautions for your protection.

- Follow all cautions, warnings, and instructions marked on the server.

Caution – Do not insert any object in an opening of the server. If any object comes into contact with a high-voltage part or short-circuits a component, fire or electric shock might result.

- Refer servicing of the server to the service engineer.

1.2.1 Electrical Safety Precautions

- Ensure that the voltage and frequency of the power source to be used matches the electrical rating labels on the server.
- Wear antistatic wrist straps when handling hard disk drives, motherboard units, or other printed circuit boards.
- Use grounded power outlets as described in the *SPARC Enterprise M3000 Server Installation Guide*.

Caution – Do not make mechanical or electrical modifications. We are not responsible for regulatory compliance of modified servers.

1.2.2 Equipment Rack Safety Precautions

- The equipment racks must be anchored to the floor, ceiling, or to adjacent frames.
- Some equipment racks are supplied with a Quake-Resistant Options Kit or stabilizer, which supports the weight of the server when it is extended on its slide rails. This prevents the equipment from toppling over during installation or maintenance.
- In the following cases, a safety evaluation must be conducted by the service engineer prior to installation or maintenance work.
  - When no Quake-Resistant Options Kits or stabilizers are attached and the equipment rack is not anchored to the floor, ensure safety by confirming that the server does not fall over when it is pulled out from the slide rails.

- When the equipment rack is mounted on a raised floor, ensure that the raised floor has sufficient strength to withstand the weight upon it when the server is extended on its slide rails. Fix the equipment rack through the raised floor to the concrete floor below it, using a proprietary mounting kit for this purpose.

Caution – If more than one server is installed in an equipment rack, maintain the servers one at a time.

For details of equipment racks, see the *SPARC Enterprise Equipment Rack Mounting Guide*.

1.2.3 Component Handling Precautions

Caution – The server is easily damaged by static electricity. To prevent damage to printed circuit boards, wear a wrist strap and connect it to the server prior to starting maintenance.

Caution – Do not bend the motherboard unit (MBU) or the components mounted on circuit boards might be damaged.

To prevent the motherboard unit from being bent, observe the following precautions:

- Hold the motherboard unit by the handle, where the board stiffener is located.
- When removing the motherboard unit from the packaging, keep the motherboard unit horizontal until you lay it on the cushioned conductive mat.
- Connectors and components on the motherboard unit have thin pins that bend easily. Therefore, do not place the motherboard unit on a hard surface.
- Be careful not to damage the small parts located on both sides of the motherboard unit.

Caution – The heat sinks can be damaged by incorrect handling. Do not touch the heat sinks while replacing or removing motherboard units. If a heat sink is loose or broken, obtain a replacement motherboard unit. When storing or carrying a motherboard unit, ensure that the heat sinks have sufficient protection.

Caution – When removing a cable such as the LAN cable, if your fingers do not reach the latch lock of the connecter, use a flat head screwdriver to push the latch to disconnect the cable. If you forcibly insert your fingers into the service clearance, the LAN port of the motherboard unit of PCI Express (PCIe) cards may be damaged.

CHAPTER 2

Hardware Overview

This chapter explains the names of components and also explains the LEDs on the operator panel and rear panel.

- Section 2.1, “Name of Each Part” on page 2-1
- Section 2.2, “Operator Panel” on page 2-5
- Section 2.3, “LED Functions of Components” on page 2-11
- Section 2.4, “External Interface Port on Rear Panel” on page 2-13
- Section 2.5, “Labels” on page 2-17

2.1 Name of Each Part

This section explains the names of parts mounted on the M3000 server.

Among these parts, those which can be replaced in the field by a certified field engineer are called Field Replaceable Units (FRU). For information on the actual replacement/expansion procedure for FRUs, see Chapter 6 to Chapter 15.

The server consists of a chassis in which various components are mounted, top cover to protect the mounted components, front panel, and rear panel. An operator panel is located on the front panel, and ports used to connect external interfaces are located on the rear panel. From the LEDs on the operator panel and rear panel, error and other status information can be checked. For details, see Section 2.2, “Operator Panel” on page 2-5 to Section 2.4, “External Interface Port on Rear Panel” on page 2-13.

FIGURE 2-1, FIGURE 2-2 and FIGURE 2-3 are the internal view, front view, and rear view of the server, respectively, and they indicate the names and abbreviated names of main components.

FIGURE 2-1 Server (Internal View)

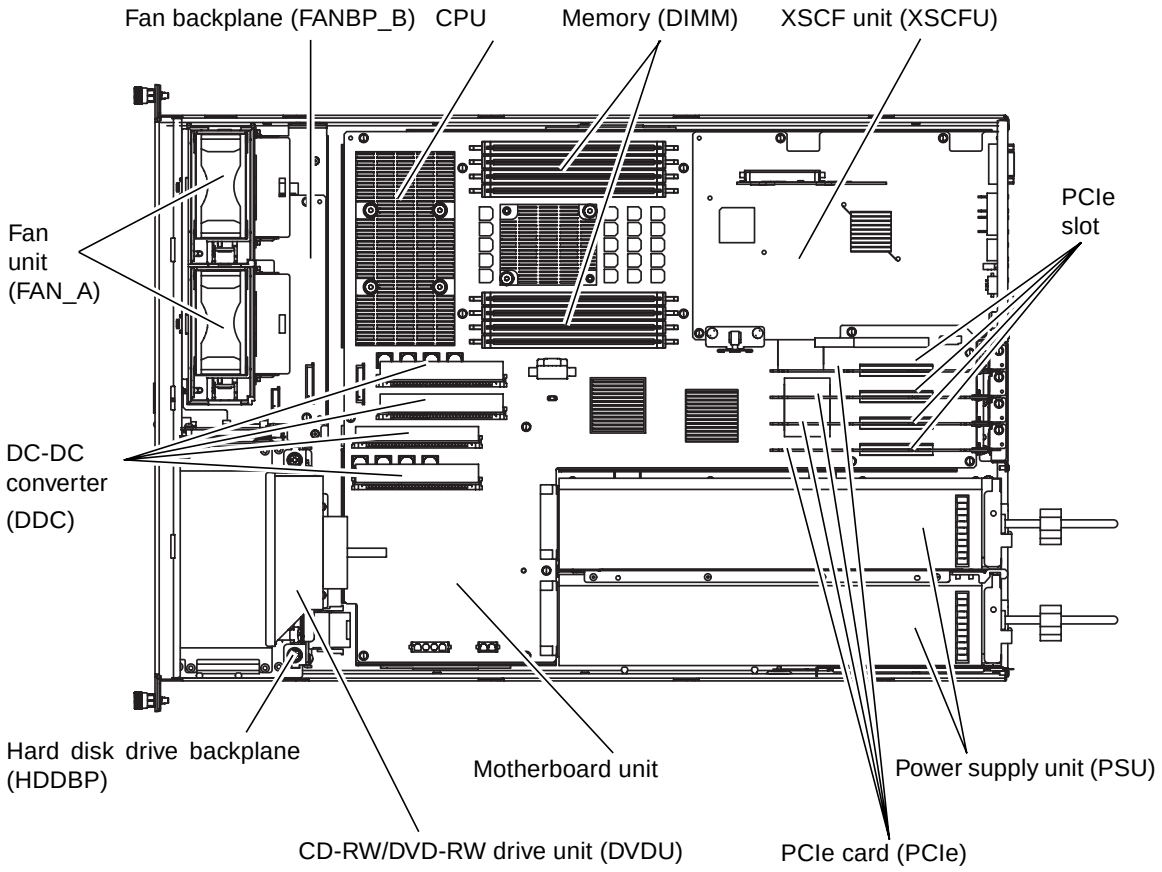
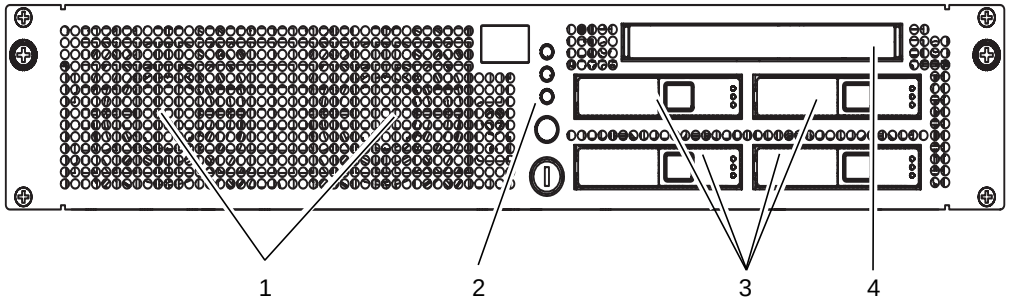
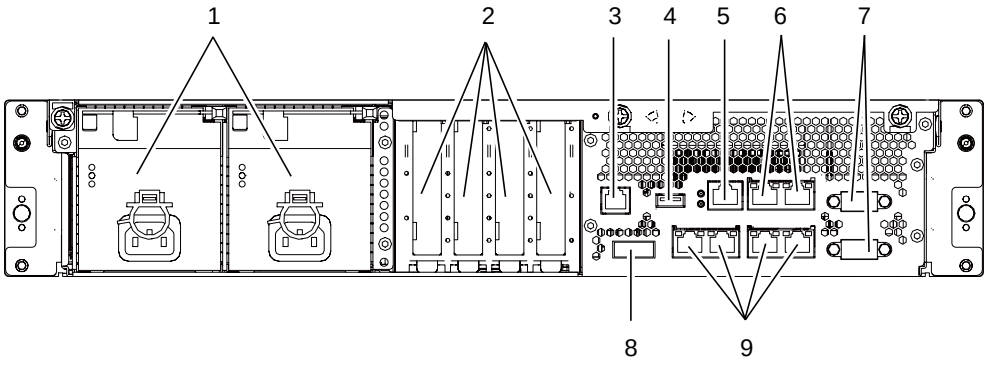


FIGURE 2-2 Server (Front View)



Location No.	Component
1	Fan unit (FAN_A)
2	Operator panel (OPNL)
3	Hard disk drive (HDD) (2.5-inch SAS disk)
4	CD-RW/DVD-RW drive unit (DVDU)

FIGURE 2-3 Server (Rear View) (AC Power Supply Model)



Location No.	Component
1	Power supply unit (PSU)
2	PCIe slot
3	RCI port
4	USB port (for XSCF)
5	Serial port (for XSCF)
6	LAN port (for XSCF)
7	UPC port
8	Serial Attached SCSI (SAS) port
9	Gigabit Ethernet (GbE) port (for OS)

2.2 Operator Panel

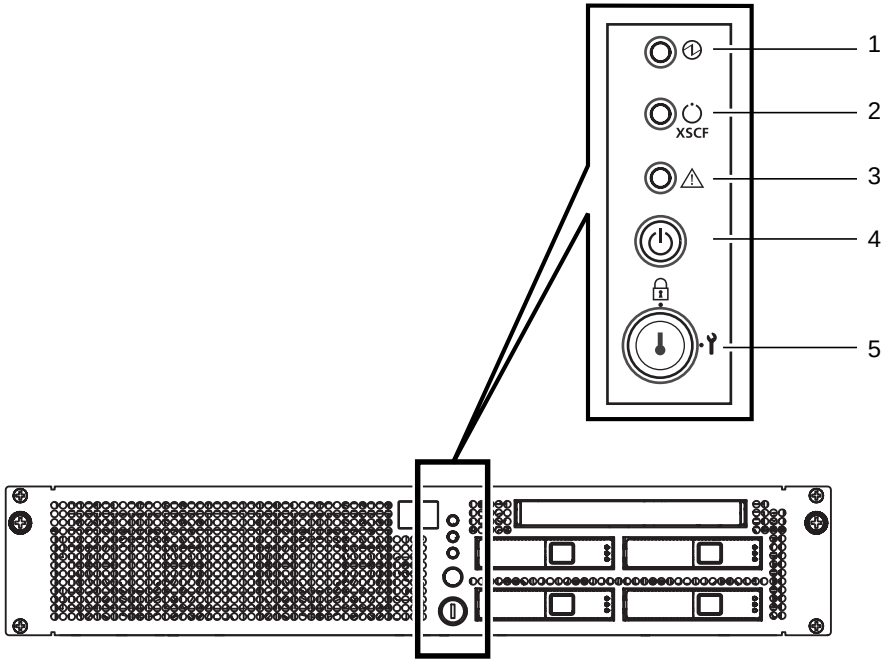
The operator panel has the important function of controlling the power of the server. The operator panel is usually locked with a key to prevent the server from being mistakenly powered off during system operation.

Before starting maintenance work, ask the system administrator to unlock the operator panel.

2.2.1 Operator Panel Overview

The system administrator or service engineer checks the operating status of the server with LEDs or operates the power supply with the power switch. FIGURE 2-4 shows the location of the operator panel.

FIGURE 2-4 Operator Panel Location



Location number	Component
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED
4	Power button
5	Mode switch (key switch)

2.2.2 Switches on the Operator Panel

TABLE 2-1 depicts the functions of the switches on the operator panel.

The switches on the operator panel include the mode switch for setting the operation mode and the power switch for turning on and off the server.

TABLE 2-1 Switches (Operator Panel)

Switch	Name		Description of function
	Mode Switch (Key Switch)		This switch is used to set the operation mode for the server. Insert the special key that is under the customer's control, to switch between modes.
		Locked	Normal operation mode • The system can be powered on with the power button, but it cannot be powered off with the power button. • The key can be pulled out at this key position.
		Service	Mode for maintenance • The system can be powered on and off with the power button. • The key cannot be pulled out at this key position. • To stop and maintain the server, set the mode to Service.
	Power button		This button is used to turn on or turn off the power to the server (a domain). Power on and power off are controlled by pressing this button in different patterns, as described below.
		Holding down the button for a short time (less than 4 seconds)	Regardless of the mode switch setting, the server is powered on. If set in the XSCF, facility (air conditioners) power-on and warm-up processing is skipped. *
		Holding down the button for a long time in Service mode (4 seconds or longer)	• If power to the server is on, OS shutdown processing is executed for all domains before the system is powered off. • If the server is being powered on, the power-on processing is cancelled, and the server is powered off. • If the server is being powered off, the operation of the power button is ignored, and the power-off processing is continued.

* In normal operation, the server is powered on only when the data center environmental conditions satisfy the specified values. Then, the server remains in the reset state until the operating system is booted.

TABLE 2-2 shows the function of the mode switch.

TABLE 2-2 Mode Switch Function

Function	Mode switch	
	Locked	Service
Inhibition of Break Signal Reception	Enabled Reception of the Break signal can be enabled or disabled for each domain using `setdomainmode` command.	Disabled
Power On/Off by power button	Only Power On is enabled.	Enabled

2.2.3 LEDs on the Operator Panel

TABLE 2-3 lists the server states displayed with the LEDs on the operator panel.

The three LED indicators on the operator panel indicate the following:

- General system status
- System error warning
- System error location

Besides the states listed in TABLE 2-3, the operator panel also displays various states of the server using combinations of the three LEDs. TABLE 2-4 indicates the states that are displayed in the course of operation from power-on to power-off of the server.

The blinking interval is 1 second (1 Hz).

TABLE 2-3 LEDs on the Operator Panel

Icon	Name	Color	Description
	POWER LED	Green	Indicates the server power status. • On: The power to the server (a domain) is on. • Off: The power to the server is off. • Blinking: The server is powered off.
 XSCF	XSCF STANDBY LED	Green	Indicates the XSCF unit status. • On: XSCF unit is functioning normally. • Off: Input power source is off or is just after turned on, and XSCF unit is stopped. • Blinking: System initialization is in progress after power was turned on.
	CHECK LED	Amber	Indicates that the server has detected an error. This is sometimes called a locator. • On: An error that hinders startup was detected. • Off: Normal, or power is not being supplied. • Blinking: Indicates that the unit is a maintenance target.

In service mode, break signals can be suppressed. If the key position is switched to Service, the server will boot into service mode the next time it reboots. Service is selected by default at the initial power-on.

TABLE 2-4 State Display by Combination of LEDs on the Operator Panel

Name			Description
POWER *	XSCF STANDBY	CHECK	
	XSCF		
Off	Off	Off	Power is not being supplied.
Off	Off	On	Power has been turned on.
Off	Blinking	Off	The XSCF unit is being initialized.
Off	Blinking	On	An error occurred in the XSCF unit.
Off	On	Off	The XSCF unit is in the standby state. The server is waiting for power-on of the air conditioning facilities in the data center.
On	On	Off	Warm-up standby processing is in progress (power is turned on after the end of processing). The power-on sequence is in progress. The server is in operation.
Blinking	On	Off	The power-off sequence is in progress. (The fan units are stopped after the end of processing.)

* READY LED is referred to when the XSCF unit status is indicated.

2.3 LED Functions of Components

This section explains the LEDs of each component. When replacing a FRU, check in advance the states of LEDs.

Normal system state can be confirmed by checking the operator panel. If an error occurs in an individual hardware component in the server, the LEDs of the FRU containing the hardware component which caused the error will indicate the error location. However, some FRUs such as DIMMs do not have LEDs.

To check the state of a FRU that has no LEDs, use an XSCF Shell command such as `showhardconf` in the maintenance terminal. For details, see TABLE 3-1.

TABLE 2-5 describes the component LEDs and their functions.

TABLE 2-5 Component LEDs and Their Functions

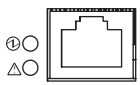
Component	Name	Color	Description
Motherboard unit (MBU) 	POWER	Indicates whether the MBU is operating.	
		On (green)	Indicates that the motherboard is operating. The motherboard cannot be removed from the server while the POWER LED is on.
		Blinking (green)	Indicates that the MBU is being incorporated into the system or being disconnected from the system.
		Off	Indicates that the MBU is stopped. The MBU can be disconnected and replaced.
	CHECK	Indicates the motherboard unit status.	
		On (amber)	Indicates that an error occurred in the MBU.
		Off	Indicates that the MBU is in the normal state.

TABLE 2-5 Component LEDs and Their Functions *(Continued)*

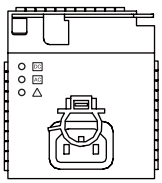
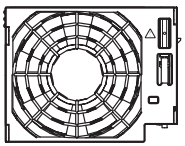
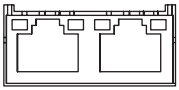
Component	Name	Color	Description
Hard disk drive (HDD)			Indicates that the hard disk drive can be removed. However, this LED is not used.
	CHECK	On (amber)	Indicates that an error occurred in the HDD. However, this LED stays on for several minutes (until initialization starts) immediately after power-on. This state does not indicate an error.
		Blinking (amber)	Indicates that the HDD is ready to be replaced.
		Off	Indicates that the HDD is in the normal state.
	READY	On (green)	Indicates that the HDD is operating. The HDD cannot be removed (cannot be replaced).
		Blinking (green)	Indicates that the HDD is performing communication. The HDD cannot be removed (cannot be replaced).
		Off	The HDD can be replaced.
Power supply unit (PSU) 	DC	On (green)	Indicates that power is turned on and being supplied.
	AC	On (green)	Indicates that input power is being supplied to the power supply unit.
		Off	Indicates that input power is not being supplied to the power supply unit.
	CHECK	On (amber)	Indicates that an error occurred in the PSU.
		Blinking (amber)	Indicates that the power supply unit is ready to be replaced.
		Off	Indicates that the PSU is in the normal state.
Fan unit (FAN_A) 	CHECK	On (amber)	Indicates that an error occurred in the fan unit.
		Blinking (amber)	Indicates that the fan unit is ready to be replaced.
		Off	Indicates that the fan unit is in the normal state.

TABLE 2-5 Component LEDs and Their Functions *(Continued)*

Component	Name	Color	Description
LAN port display part 	ACTIVE	On (green)	Indicates that communication is being performed through the LAN port.
		Off	Indicates that communication is not being performed through the LAN port.
	LINK SPEED	On (amber)	Indicates that the communication speed of the LAN port is 1 Gbps.
		On (green)	Indicates that the communication speed of the LAN port is 100 Mbps.
		Off	Indicates that the communication speed of the LAN port is 10 Mbps.

2.4 External Interface Port on Rear Panel

This section shows the location of the external interface ports located on the server rear panel and explains their functions.

FIGURE 2-5 External Interface Port Locations

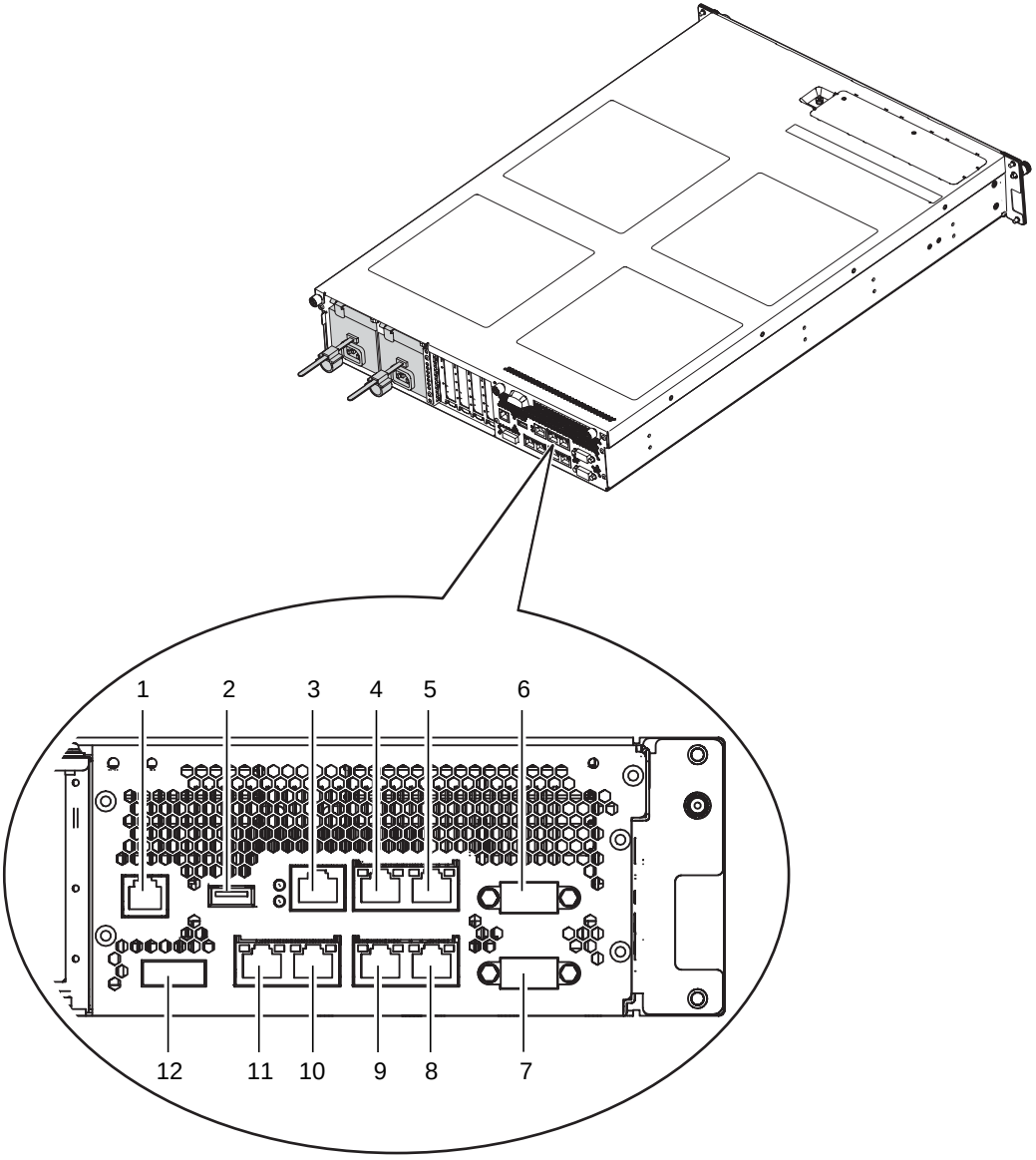


TABLE 2-6 External Interface Port Functions

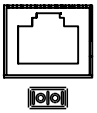
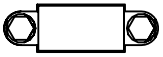
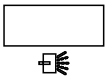
Location number	Component		Description
1	RCI port		Used to connect the server to a peripheral device having a RCI connector to enable power interlocking and error monitoring.
2	USB port (for XSCF)		Exclusive for maintenance personnel. Cannot be connected to general-purpose USB devices.
3	Serial port (for XSCF)		Connects to the XSCF unit through serial connection to set up and manage the server.
4	LAN port 1 (for XSCF)		Accommodates a 100Base-TX LAN cable to set up the server and display status. • XSCF Shell (command-line interface: CLI): • XSCF Web (browser user interface: BUI): Through CLI or BUI, the user or system administrator monitors the server, displays status, operates domains, and displays information on the console.
5	LAN port 0 (for XSCF)		
6	UPC port 1		By connecting an uninterruptible power supply (UPS) unit that has the UPS controller (UPC) interface, stable power supply is provided in the event of a failure in the power supply or even a large-scale power failure. If a single power feed is used, connect a UPS cable to UPC port 0. In a dual power feed, connect UPS cables to UPC ports 0 and 1.
7	UPC port 0		

TABLE 2-6 External Interface Port Functions *(Continued)*

Location number	Component		Description
8	GbE port 0 (for OS)	GLAN 0	Up to 4 100Base-TX/1000Base-T cables can be connected to GbE ports. High-capacity data can be transferred at a high speed.
9	GbE port 1 (for OS)	GLAN 1	
10	GbE port 2 (for OS)	GLAN 2	
11	GbE port 3 (for OS)	GLAN 3	
12	SAS port		Accommodates external Serial Attached SCSI (SAS) devices such as a tape drive.

2.5 Labels

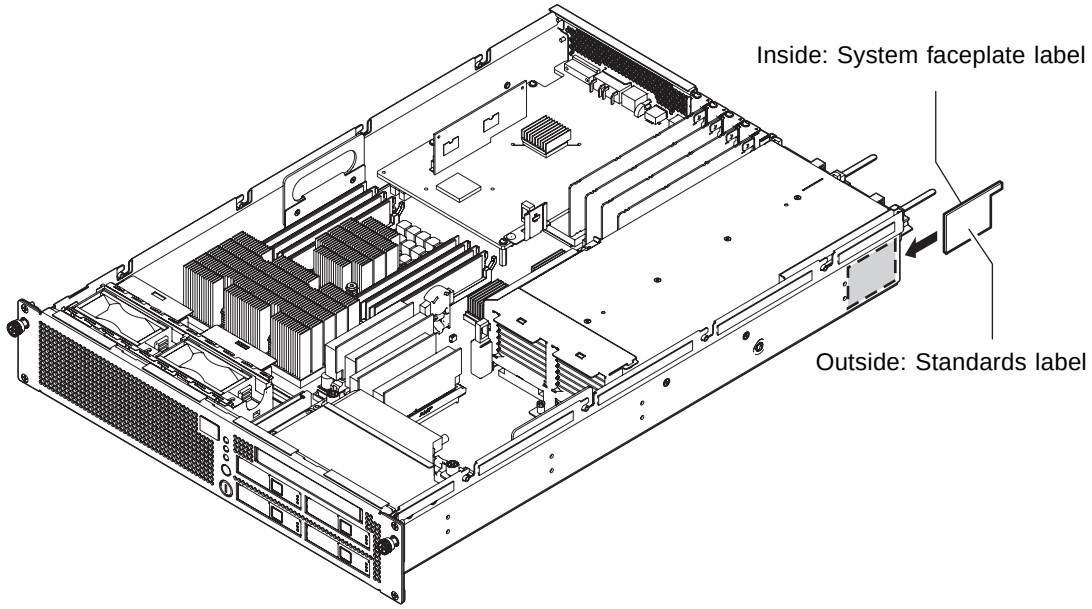
This section explains the labels and the card affixed to the server.

Note – The information on the label might differ from that shown on the affixed labels.

- The model number, serial number, and hardware version, all of which are required for maintenance and management, are shown on the system faceplate label.
- The standards label is affixed close to the system faceplate label and shows the approval standards.
  - Safety: NRTL/C
  - Radio wave: VCCI-A, FCC-A, DOC-A, MIC
  - Safety and radio wave: CE

A label-affixed card that can be inserted or extracted is provided near the power supply unit at the right side at the rear of the server (see TABLE 2-6). The card should be instered in such a way that the standards label faces the outside of the server and the system faceplate label faces the inside of the server.

FIGURE 2-6 Label Locations



CHAPTER 3

Troubleshooting

This chapter provides the fault diagnosis information and the actions to take for problems.

- Section 3.1, “Emergency Power Off” on page 3-1
- Section 3.2, “Failure Diagnostic Method” on page 3-2
- Section 3.3, “Checking the Server and System Configuration” on page 3-4
- Section 3.4, “Error Conditions” on page 3-8
- Section 3.5, “Using Troubleshooting Commands” on page 3-11
- Section 3.6, “General Solaris Troubleshooting Commands” on page 3-19

3.1 Emergency Power Off

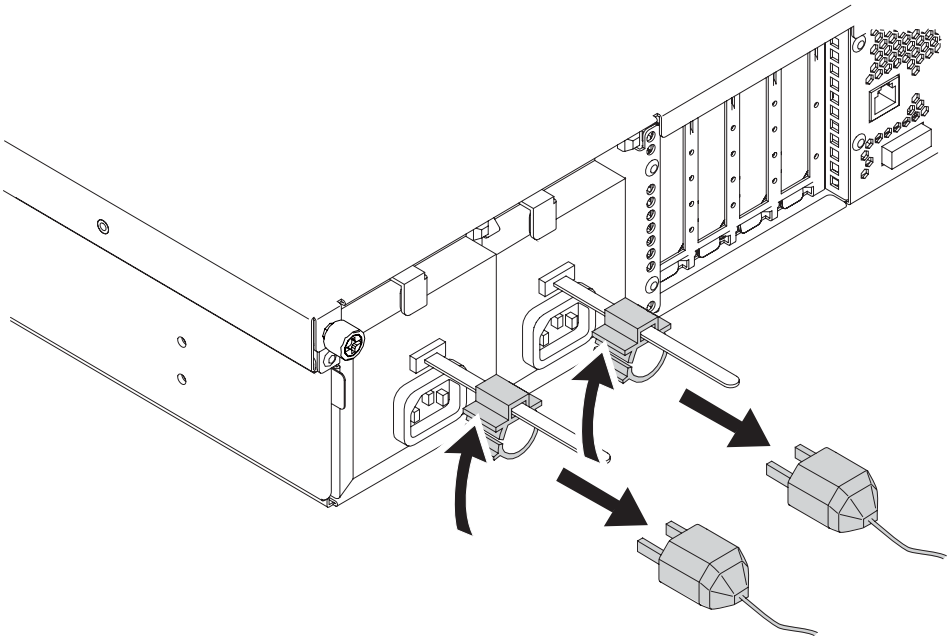
This section explains how to power off in an emergency.

Caution – In an emergency (such as smoke or flames coming from the server), immediately stop using the server and turn off the power supply. Regardless of the type of business, give top priority to fire prevention measures.

1. **Press the power switch for more than 4 seconds to power off the server.**

2. **Remove the power cord clamp and disconnect the cable.**

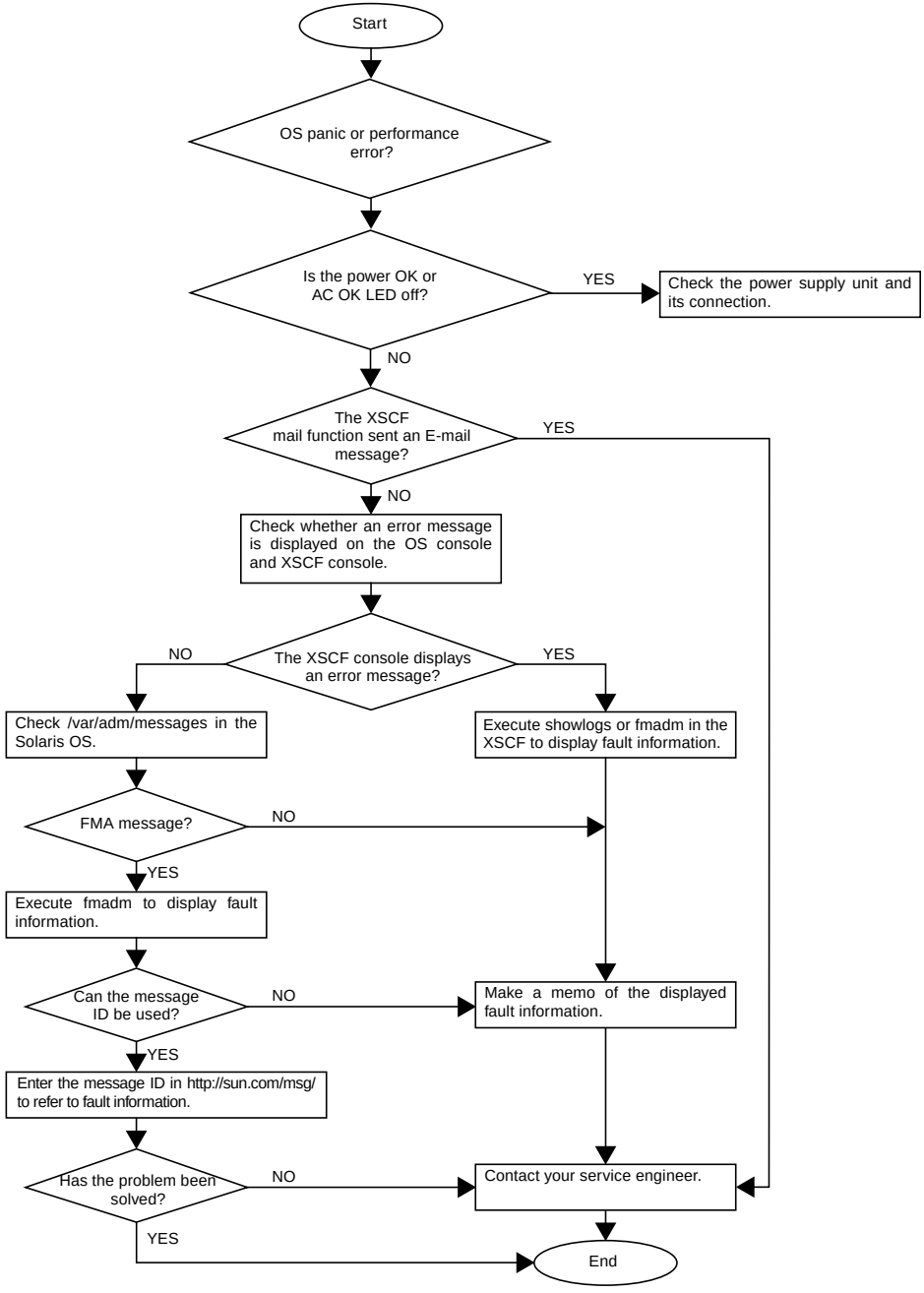
FIGURE 3-1 Power-off Method



3.2 Failure Diagnostic Method

When an error occurs, a message is displayed on the maintenance monitor in many cases. Use the flowchart in FIGURE 3-2 to find the correct methods for diagnosing failures.

FIGURE 3-2 Diagnostic Method Flowchart


Start
OS panic or performance error?
Is the power OK or AC OK LED off?
YES
Check the power supply unit and its connection.
NO
The XSCF mail function sent an E-mail message?
YES
NO
Check whether an error message is displayed on the OS console and XSCF console.
The XSCF console displays an error message?
NO
YES
Check /var/adm/messages in the Solaris OS.
Execute showlogs or fmadm in the XSCF to display fault information.
FMA message?
NO
YES
Execute fmadm to display fault information.
Can the message ID be used?
NO
Make a memo of the displayed fault information.
YES
Enter the message ID in http://sun.com/msg/ to refer to fault information.
Has the problem been solved?
NO
Contact your service engineer.
YES
End

3.3 Checking the Server and System Configuration

The operating conditions must remain the same before and after maintenance. If an error occurs in the server, save the system configuration and component status information. Confirm that the recovered state after maintenance is the same as that before maintenance.

If an error occurs in the server, one of the following messages is displayed.

- Solaris™ Operating System message file
- XSCF Shell `showhardconf`(8) command and `showstatus`(8) command
- Management console
- Service processor log

3.3.1 Checking the Hardware Configuration and FRU Status

To replace a faulty FRU and perform the maintenance on the server, it is important to check and understand the hardware configuration of the server and the state of each hardware component.

The hardware configuration refers to information that indicates to which layer a hardware component belongs.

The status of each hardware component refers to information on the conditions of a standard or optional component in the server: temperature, power supply voltage, CPU operating conditions, and other status information.

To check the hardware configuration and the status of each hardware component, use XSCF Shell commands from the maintenance terminal. See TABLE 3-1 for the commands used.

TABLE 3-1 Commands for Checking Hardware Configuration

Command	Description
`showhardconf`	Displays hardware configuration.
`showstatus`	Displays the status of a component. This command is used only when a faulty component is checked.

TABLE 3-1 Commands for Checking Hardware Configuration *(Continued)*

Command	Description
`showboards`	Displays information on the system board (XSB).
`showdcl`	Displays the hardware resource configuration information of a domain.
`showfru`	Displays the setting information of a device.

The status of each component can be checked based on the On or blinking state of the component LEDs.

For the component types and LED states, see TABLE 2-3 and TABLE 2-5.

For details of commands, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* and the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual*.

3.3.1.1 Checking the Hardware Configuration.

To check the hardware configuration, authority (user account) to log in with the XSCF user account to the XSCF is required. The following procedure can be used to check the hardware configuration from the maintenance terminal.

Ask the system administrator for the required information, such as the user account and password. For details, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

1. **Log in to XSCF Shell.**
2. **Type** `showhardconf`**.**

```
XSCF> showhardconf
```

The `showhardconf` command displays hardware configuration information. For details, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

3.3.2 Checking the Software and Firmware Configurations

The software and firmware configurations and versions affect the operation of the server. To change the configuration or investigate a problem, check the latest information and check for any problems in the software.

Software and firmware varies according to user conditions.

- The software configuration and version can be checked in the Solaris Operating System. Refer to the Solaris OS documentation for more information.
- The firmware configuration and versions can be checked from the maintenance terminal using XSCF Shell commands. Refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information.

Check the software and firmware configuration information with assistance from the system administrator. However, if you have received login authority from the system administrator, the following commands can be used from the maintenance terminal for these checks:

TABLE 3-2 Commands for Checking the Software Configuration

Command	Description
`showrev`(1M)	Displays system configuration information and Solaris OS patch information.
`uname`(1)	Outputs current system information.

TABLE 3-3 Commands for Checking the XSCF Firmware Configuration

Command	Description
`version`(8)	Outputs current firmware version information.
`showhardconf`(8)	Outputs information on the components mounted on the server.
`showstatus`(8)	Displays the status of a component. This command is used only when a faulty component is checked.
`showboards`(8)	Displays XSB information. It can display information on an XSB that belongs to the specified domain and information on all XSBs mounted. An XSB combines hardware resources on physical system boards. The M3000 server consists of a single physical system board (Uni-XSB).
`showdcl`(8)	Displays the configuration information of a domain (hardware resource information).
`showfru`(8)	Displays the setting information of a device.

3.3.2.1 Checking the Software Configuration

The following procedure can be used to check the software configuration from the domain console.

- **Type** `showrev`**.**

```
# showrev
```

The `showrev` command displays system configuration information on the screen.

3.3.2.2 Checking the Firmware Configuration

Login authority is required to check the firmware configuration. The procedure below can be used to check the configuration from the maintenance terminal.

1. **Log in with the account of the XSCF hardware maintenance engineer.**
2. **Type** `version`**.**

```
XSCF> version
```

The `version` command displays firmware version information on the screen. For details, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

3.3.2.3 Downloading Error Log Information

To download error log information, use the XSCF log fetch function. The XSCF unit has an interface with external units so that the service engineer can easily obtain useful maintenance information such as error logs.

Connect the maintenance terminal, and use the XSCF Shell or XSCF Web to download error log information to the maintenance terminal.

3.4 Error Conditions

This section describes error conditions and relevant corrective actions.

This work is explained in the following sections:

- Section 3.4.1, "Predictive Self-Healing Tools" on page 3-8
- Section 3.4.2, "Monitoring Output" on page 3-10
- Section 3.4.3, "Messaging Output" on page 3-10

Details of the fault information, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

You can find more detailed descriptions of Solaris OS Predictive Self-Healing at the website below:

`http://www.sun.com/bigadmin/features/articles/selfheal.html`

Predictive self-healing is an architecture and methodology for automatically diagnosing, reporting, and handling software and hardware error conditions. This new technology reduces the time required to debug a hardware or software problem and provides the administrator and service engineer with detailed data about each error.

3.4.1 Predictive Self-Healing Tools

In the Solaris OS, Solaris Fault Manager runs in the background. When an error occurs, the system software recognizes the error and attempts to determine the faulty hardware component. The system software also takes steps to prevent the faulty component from being used until it has been replaced. The system software performs the following activities:

- Receives telemetry information about errors detected by the system software.
- Diagnoses the errors.
- Initiates predictive self-healing activities. For example, Solaris Fault Manager can disable faulty components.
- When possible, causes the faulty FRU to provide an LED indication of the error in addition to populating system console messages with more details.

TABLE 3-4 shows typical messages generated when an error occurs. Messages are displayed on your console and are recorded in the `/var/adm/messages` file.

A message in TABLE 3-4 indicates that the fault has already been diagnosed. If there was any corrective action that the system could take, the system has already taken it. If your server is still running, the corrective action continues to be taken.

TABLE 3-4 Predictive Self-Healing Messages

Output displayed	Description
Nov 1 16:30:20 dt88-292 EVENT-TIME:Tue Nov 1 16:30:20 PST 2005	EVENT-TIME: The time stamp of the diagnosis
Nov 1 16:30:20 dt88-292 PLATFORM:SUNW,A70, CSN:-, HOSTNAME:dt88-292	PLATFORM: A description of the server encountering the error
Nov 1 16:30:20 dt88-292 SOURCE:eft, REV: 1.13	SOURCE: Information on the Diagnosis Engine used to determine the error
Nov 1 16:30:20 dt88-292 EVENT-ID:afc7e660-d609-4b2f-86b8-ae7c6b8d50c4	EVENT-ID: The Universally Unique event ID for this error
Nov 1 16:30:20 dt88-292 DESC: Nov 1 16:30:20 dt88-292 A problem was detected in the PCI Express subsystem	DESC: A basic description of the error
Nov 1 16:30:20 dt88-292 Refer to http://sun.com/msg/SUN4-8000-0Y for more information.	WEB SITE: Where to find specific information and actions for this error
Nov 1 16:30:20 dt88-292 AUTO-RESPONSE:One or more device instances may be disabled.	AUTO-RESPONSE: What, if anything, the system did to alleviate any follow-on problems
Nov 1 16:30:20 dt88-292 IMPACT:Loss of services provided by the device instances associated with this fault.	IMPACT: A description of what is considered to be the impact of the fault
Nov 1 16:30:20 dt88-292 REC-ACTION:Schedule a repair procedure to replace the affected device.Use Nov 1 16:30:20 dt88-292 fmdump -v -u EVENT_ID to identify the device or contact Sun for support.	REC-ACTION: A brief description of the corrective action the system administrator should take

3.4.2 Monitoring Output

To understand error conditions, collect monitoring output information. For the collection of the information, use the commands shown in TABLE 3-5.

TABLE 3-5 XSCF Commands for Checking Monitoring Output

Command	Operand	Description
showlogs(8)	console	Displays the console of a domain.
	monitor	Logs messages that are displayed in the message window.
	panic	Logs output to the console during a panic.
	ipl	Collects console data generated during the period of the power-on of a domain to the completion of the Solaris OS start.

3.4.3 Messaging Output

To understand error conditions, collect messaging output information. For the collection of the information, use the commands shown in TABLE 3-6.

TABLE 3-6 Commands for Checking Messaging Output

Command	Operand	Description
showlogs(8)	env	Displays the temperature history log. The environmental temperature data and power status are indicated in 10-minute intervals. The data is stored for a maximum of six months.
	power	Displays power and reset information.
	event	Displays information reported to the system and stored it as event logs.
	error	Displays error logs.
fmdump (1M) fmdump(8)		Displays FMA diagnostic results and errors. This command is provided as a Solaris OS command and XSCF Shell command.

Each error message logged by the predictive self-healing architecture has a message ID and Web address associated with the message. From this message ID and Web address, information on the most up-to-date corrective measures can be retrieved.

For details of predictive self-healing, see the Solaris OS documents.

3.5 Using Troubleshooting Commands

When any message listed in TABLE 3-4 is displayed, detailed information on the error may be required. For details on troubleshooting commands, see manual pages of the Solaris OS or XSCF Shell. This section provides detailed explanations of the following commands:

- "Using the `showhardconf` Command" on page 3-11
- "Using the `showlogs` Command" on page 3-14
- "Using the `showstatus` Command" on page 3-15
- "Using the `fmdump` Command" on page 3-16
- "Using the `fmadm` Command" on page 3-17
- "Using the `fmstat` Command" on page 3-19

3.5.1 Using the `showhardconf` Command

The `showhardconf` command displays information on each FRU. The following information is displayed:

- Current configuration and status
- Number of mounted units
- Domain information
- Name properties of the PCIe card

```
XSCF> showhardconf
 SPARC Enterprise M3000;
     + Serial:IKK0813023; Operator_Panel_Switch:Locked;
     + Power_Supply_System:Single; SCF-ID:XSCF#0;
     + System_Power:On; System_Phase:Cabinet Power On;
     Domain#0 Domain_Status:OpenBoot Execution Completed;

     MBU_A Status:Normal; Ver:0101h; Serial:PP0829045F  ;
         + FRU-Part-Number:CA07082-D902 A1   /541-3302-01          ;
         + CPU Status:Normal;
             + Freq:2.520 GHz; Type:32;
             + Core:4; Strand:2;
         + Memory_Size:8 GB;
         MEM#0A Status:Normal;
             + Code:ce000000000000001M3 93T2950EZA-CE6 4145-473b3c23;
             + Type:1A; Size:1 GB;
         MEM#0B Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2918;
             + Type:1A; Size:1 GB;
         MEM#1A Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28af;
             + Type:1A; Size:1 GB;
         MEM#1B Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28ab;
             + Type:1A; Size:1 GB;
         MEM#2A Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b283e;
             + Type:1A; Size:1 GB;
         MEM#2B Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2829;
             + Type:1A; Size:1 GB;
         MEM#3A Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2840;
             + Type:1A; Size:1 GB;
         MEM#3B Status:Normal;
             + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2830;
             + Type:1A; Size:1 GB;
         PCI#0 Name_Property:fibre-channel; Card_Type:Other;
         PCI#1 Name_Property:fibre-channel; Card_Type:Other;
         PCI#2 Name_Property:pci; Card_Type:Other;
         PCI#3 Name_Property:pci; Card_Type:Other;
     OPNL Status:Normal; Ver:0101h; Serial:PP0829045Y  ;
         + FRU-Part-Number:CA07082-D912 A0   /541-3306-01          ;
```

The showhardconf output continued:

```
PSU#0 Status:Normal; Serial:EA08260208;
    + FRU-Part-Number:CA01022-0720 03C  /300-2193-03   ;
    + Power_Status:On;
    + Type:AC;
PSU#1 Status:Normal; Serial:EA08260210;
    + FRU-Part-Number:CA01022-0720 03C  /300-2193-03   ;
    + Power_Status:On;
    + Type:AC;
FANBP_B Status:Normal; Ver:0101h; Serial:PP082704TD  ;
    + FRU-Part-Number:CA20399-B12X 006AB/541-3304-02          ;
    FAN_A#0 Status:Normal;
    FAN_A#1 Status:Normal;
```

For details, see the showhardconf manual pages.

3.5.2 Using the showlogs Command

The showlogs command displays information of specified logs in the order of time stamps. The information with the oldest time stamp is displayed first. The showlogs command displays the following logs:

- Error log
- Power log
- Event log
- Temperature and humidity record
- Monitoring message log
- Console message log
- Panic message log
- IPL message log

```
XSCF> showlogs error
Date: Jun 17 11:05:32 JST 2008     Code: 80000000-c3ff0000-0173000600000000
    Status: Alarm                  Occurred: Jun 17 11:05:32.522 JST 2008
    FRU: /PSU#1
    Msg: PSU shortage
Date: Jun 17 13:41:46 JST 2008     Code: 80002080-7801c201-0130000000000000
    Status: Alarm                  Occurred: Jun 17 13:41:44.861 JST 2008
    FRU: /MBU_A,*
    Msg: Board control error (MBC link error)
Date: Jun 17 13:46:31 JST 2008     Code: 60000000-cd01c701-0164010100000000
    Status: Warning                Occurred: Jun 17 13:46:31.158 JST 2008
    FRU: /OPNL,/FANBP_B
    Msg: TWI access error
XSCF>
```

3.5.3 Using the `showstatus` Command

The `showstatus` command displays information about faulty or degraded units that are among the FRUs composing the server and information on the units on the layers immediately above the layers of the faulty or degraded units. For each of the displayed units, an asterisk (*) indicating that the unit is faulty is displayed with any of the following status indicators, which is displayed after "Status:".

- Normal: Normal state
- Faulted: The unit is faulty and is not operating.
- Degraded: The unit is operating. The unit is partly faulty or degraded and some error has been detected. Although a faulty state is displayed for the unit, it is operating normally.
- Deconfigured: There is no problem with the unit itself, but it is degraded due to a configuration problem, environmental problem, or the degradation of another unit.
- Maintenance: Maintenance is being performed. `replacefru`(8) or `addfru`(8) is being executed.

```
XSCF> showstatus
    FANBP_B Status:Normal;
*       FAN_A#0 Status:Faulted;
XSCF>
```

3.5.4 Using the fmdump Command

The fmdump command displays the contents of the log managed by the module called Fault Manager.

This example assumes that only one error exists.

```
# fmdump
TIME                 UUID                                 SUNW-MSG-ID
Nov 02 10:04:15.4911 0ee65618-2218-4997-c0dc-b5c410ed8ec2 SUN4-8000-0Y
```

3.5.4.1 fmdump -V Command

To get more detailed information you can use the -e option, as shown in the following example.

```
# fmdump -V -u 0ee65618-2218-4997-c0dc-b5c410ed8ec2
TIME                 UUID                                 SUNW-MSG-ID
Nov 02 10:04:15.4911 0ee65618-2218-4997-c0dc-b5c410ed8ec2  SUN4-8000-0Y
100% fault.io.fire.asic
FRU: hc://product-id=SUNW,A70/motherboard=0
rsrc: hc:///motherboard=0/hostbridge=0/pciexrc=0
```

The output method using the -V option displays at least three additional lines.

- The first line is the same information shown for console messages above, including a time stamp, UUID, and message ID.
- The second line is a declaration of the certainty of diagnosis. In this case we are 100 percent sure the failure is in the ASIC described. If the diagnosis may involve multiple components, you may see two lines here with 50% in each of the two lines.
- The "FRU" line indicates what component must be replaced to return the server to a fully operational state.
- The "rsrc" line indicates the component that has become unusable because of this error.

3.5.4.2 `fmdump -e` Command

To get information of the errors that caused this failure you can use the -e option, as shown in the following example.

```
# fmdump -e
TIME                 CLASS
Nov 02 10:04:14.3008 ereport.io.fire.jbc.mb_per
```

3.5.5 Using the `fmadm` Command

3.5.5.1 Using the `fmadm faulty` Command

The fmadm faulty command can be used by administrators and service personnel to view and modify system configuration parameters that are maintained by the Solaris fault manager. The command is primarily used to determine the status of a component involved in a fault, as shown in the following example:

```
# fmadm faulty
STATERESOURCE / UUID
-------- ------------------------------------------------------
degraded dev:////pci@1e,600000
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
# fmadm repair
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
```

The PCIe slot has been degraded and it is associated with the same UUID as above. Also, the "faulted" status may be displayed.

3.5.5.2 `fmadm repair` Command

When the `fmadm faulty` command displays a fault, the `fmadm repair` command must be executed to clear the FRU information in the domain after replacement of the motherboard unit that has encountered the error. If the `fmadm repair` command is not executed, the error message is not cleared.

If the `fmadm faulty` command displays a fault, clearing the FMA resource cache on the operating system side causes no problem. Data in the cache does not need to match the hardware fault information held by the XSCF.

```
# fmadm repair
STATERESOURCE / UUID
-------- ------------------------------------------------------
degraded dev:////pci@1e,600000
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
```

3.5.5.3 `fmadm config` Command

The `fmadm config` command output displays the version number and current status of the diagnosis engine that is being used by the server. Whether the latest engine is being used can be determined by consulting the SunSolve web site.

```
# fmadm config
MODULE                  VERSION STATUS  DESCRIPTION
cpumem-diagnosis        1.6     active  CPU/Memory Diagnosis
cpumem-retire           1.1     active  CPU/Memory Retire Agent
disk-transport          1.0     active  Disk Transport Agent
eft                     1.16    active  eft diagnosis engine
event-transport         2.0     active  Event Transport Module
fabric-xlate            1.0     active  Fabric Ereport Translater
fmd-self-diagnosis      1.0     active  Fault Manager Self-Diagnosis
io-retire               1.0     active  I/O Retire Agent
snmp-trapgen            1.0     active  SNMP Trap Generation Agent
sysevent-transport      1.0     active  SysEvent Transport Agent
syslog-msgs             1.0     active  Syslog Messaging Agent
zfs-diagnosis           1.0     active  ZFS Diagnosis Engine
zfs-retire              1.0     active  ZFS Retire Agent
```

3.5.6 Using the `fmstat` Command

The `fmstat` command reports statistical information and a set of modules that are associated with the module called Solaris Fault Manager. By using the `fmstat` command, statistical information about the diagnostic engine and diagnostic agent that are currently involved in fault management can be displayed.

The following output example shows that the fmd-self-diagnosis DE module (displayed also on the console output) has received accepted events.

```
#  fmstat
module             ev_recv ev_acpt wait  svc_t  %w  %b  open solve  memsz  bufsz
cpumem-diagnosis         0       0  0.0    0.0   0   0     0     0   3.0K      0
cpumem-retire            0       0  0.0    0.0   0   0     0     0      0      0
disk-transport           0       0  0.0 1793.8   0   0     0     0    40b      0
eft                      0       0  0.0    0.0   0   0     0     0   1.2M      0
event-transport          0       0  0.0    0.0   0   0     0     0   210b      0
fabric-xlate             0       0  0.0    0.0   0   0     0     0      0      0
fmd-self-diagnosis       0       0  0.0    0.0   0   0     0     0      0      0
io-retire                0       0  0.0    0.0   0   0     0     0      0      0
snmp-trapgen             0       0  0.0    0.0   0   0     0     0    32b      0
sysevent-transport       0       0  0.0 2395.3   0   0     0     0      0      0
syslog-msgs              0       0  0.0    0.0   0   0     0     0      0      0
zfs-diagnosis            0       0  0.0    0.0   0   0     0     0      0      0
zfs-retire               0       0  0.0    0.0   0   0     0     0      0      0
```

3.6 General Solaris Troubleshooting Commands

Superuser commands of this type are useful to determine whether there is a problem with the server, network, or another server connected via the network.

This section explains the following commands:

- "Using the `iostat` Command" on page 3-20
- "Using the `prtdiag` Command" on page 3-21
- "Using the `prtconf` Command" on page 3-23
- "Using the `netstat` Command" on page 3-26
- "Using the `ping` Command" on page 3-27
- "Using the `ps` Command" on page 3-28
- "Using the `prstat` Command" on page 3-29

Most of these commands are located in the `/usr/bin directory or /usr/sbin directory`.

3.6.1 Using the `iostat` Command

The `iostat` command repeatedly reports terminal, drive, and I/O activity, as well as CPU utilization.

3.6.1.1 Options

TABLE 3-7 lists the options of the `iostat` command and how those options can help troubleshoot the server.

TABLE 3-7 Options for `iostat`

Option	Description	How it can help
No option	Reports status of local I/O devices.	A quick three-line output of device status information.
`-c`	Reports the percentages of time the system has spent in user mode, in system mode, waiting for I/O, and idling.	Quick report of CPU status
`-e`	Displays device error summary statistics. Displays the total number of errors, hardware errors, software errors, and transfer errors.	Provides a short table with accumulated errors. Identifies suspect I/O devices.
`-E`	Displays all device error statistics.	Provides information about devices: manufacturer, model number, serial number, size, and errors.
`-n`	Displays names in a descriptive format.	The descriptive format helps identify devices.
`-x`	Reports extended drive statistics of each drive. The output is in a tabular form.	Similar to the `-e` option, but provides rate information. This helps identify internal devices with poor performance and other I/O devices with poor performance across the network.

The following example shows output for the `iostat` command:

```
# iostat -En
c0t0d0    Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Model: ST3120026A    Revision: 8.01  Serial No: 3JT4H4C2
Size: 120.03GB <120031641600 bytes>
Media Error: 0 Device Not Ready: 0  No Device: 0 Recoverable: 0
Illegal Request: 0
c0t2d0    Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: LITE-ON  Product: COMBO SOHC-4832K Revision: O3K1 Serial No:
Size: 0.00GB <0 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
```

3.6.2 Using the `prtdiag` Command

The `prtdiag` command displays system configuration and diagnostic information. The diagnostic information identifies any failed FRU in the system.

The `prtdiag` command is located in the `/usr/platform/`*platform-name*`/sbin/directory`.

The `prtdiag` command may indicate a slot number different from that shown elsewhere in this document. This is normal.

3.6.2.1 Options

TABLE 3-8 lists the options of the `prtdiag` command and how those options can help troubleshooting.

TABLE 3-8 Options for `prtdiag`

Option	Description	How it can help
No option	Lists components.	Shows CPU information, memory configuration, PCIe cards installed, OBP version, status of the mode switch, and CPU operation mode.
`-v`	Verbose mode.	Provides the same information as no option. Additionally, displays the detail information of PCIe cards.

The following example shows output for the `prtdiag` command in verbose mode:

```
# prtdiag -v
System Configuration:  Sun Microsystems  sun4u SPARC Enterprise M3000 Server
System clock frequency: 1064 MHz
Memory size: 7808 Megabytes

================================== CPUs ===========================

     CPU                 CPU        Run   L2$   CPU   CPU
LSB  Chip                 ID        MHz   MB    Impl. Mask
---  ----  ----------------------  ----  ---   ----- ----
 00    0    0, 1, 2, 3, 4, 5, 6, 7  2520  5.0     7   145

================== Memory Configuration ===========================

    Memory  Available     Memory    DIMM   # of  Mirror  Interleave
LSB Group   Size          Status    Size   DIMMs Mode    Factor
--- ------  ------------  -------   ------ ----- ------- ----------
 00   A      4096MB         okay     1024MB    4    no       2-way
 00   B      3712MB         okay     1024MB    4    no       2-way

========================== IO Devices ============================

    IO                                                  Lane/Frq
LSB Type  LPID  RvID,DvID,VnID   BDF    State Act,Max     Name          Model
Logical Path
--- ----- ----  ---------------  -------- ----- -------- ----------------- ----
------   ----------------------------

00  PCIe  0     aa, 8533, 10b5   2, 0, 0  okay  8,  8  pci-pciex10b5,8533
N/A    /pci@0,600000/pci@0
00  PCIe  0     aa, 8533, 10b5   3, 0, 0  okay  4,  8  pci-pciex10b5,8533
N/A    /pci@0,600000/pci@0/pci@0
00  PCIe  0     aa, 8533, 10b5   3, 1, 0  okay  4,  4  pci-pciex10b5,8533
N/A    /pci@0,600000/pci@0/pci@1
00  PCIe  0     aa, 8533, 10b5   3, 2, 0  okay  4,  4  pci-pciex10b5,8533
N/A    /pci@0,600000/pci@0/pci@2
00  PCIe  0     aa, 8533, 10b5   3, 8, 0  okay  0,  8  pci-pciex10b5,8533
N/A    /pci@0,600000/pci@0/pci@8
00  PCIe  0      8,   58, 1000   4, 0, 0  okay  4,  8  scsi-pciex1000,58
LSI,1068E /pci@0,600000/pci@0/pci@0/scsi@0
00  PCIx  0     b5,  103, 1166   5, 0, 0  okay 133,133 pci-pciex1166,103
N/A    /pci@0,600000/pci@0/pci@1/pci@0
00  PCI   0     a3, 1678, 14e4   6, 4, 0  okay  --,133 network-pci14e4,1678
N/A    /pci@0,600000/pci@0/pci@1/pci@0/network@4
```

The prtdiag output continued:

```
00  PCI   0     a3, 1678, 14e4   6, 4, 1  okay  --,133 network-pci14e4,1678
N/A    /pci@0,600000/pci@0/pci@1/pci@0/network@4,1
00  PCIx  0     b5,  103, 1166   7, 0, 0  okay 133,133 pci-pciex1166,103
N/A    /pci@0,600000/pci@0/pci@2/pci@0
00  PCI   0     a3, 1678, 14e4   8, 4, 0  okay  --,133 network-pci14e4,1678
N/A    /pci@0,600000/pci@0/pci@2/pci@0/network@4
00  PCI   0     a3, 1678, 14e4   8, 4, 1  okay  --,133 network-pci14e4,1678
N/A    /pci@0,600000/pci@0/pci@2/pci@0/network@4,1
00  PCIe  1     aa, 8533, 10b5   2, 0, 0  okay   8,  8  pci-pciex10b5,8533
N/A    /pci@1,700000/pci@0
00  PCIe  1     aa, 8533, 10b5   3, 0, 0  okay   0,  8  pci-pciex10b5,8533
N/A    /pci@1,700000/pci@0/pci@0
00  PCIe  1     aa, 8533, 10b5   3, 8, 0  okay   0,  8  pci-pciex10b5,8533
N/A    /pci@1,700000/pci@0/pci@8
00  PCIe  1     aa, 8533, 10b5   3, 9, 0  okay   0,  8  pci-pciex10b5,8533
N/A    /pci@1,700000/pci@0/pci@9
==================== Hardware Revisions ====================

System PROM revisions:
----------------------

OBP 4.24.8 2008/04/23 15:15

=================== Environmental Status ===================

Mode switch is in LOCK mode

================== System Processor Mode ==================

SPARC64-VII mode

#
```

3.6.3 Using the prtconf Command

Similar to the show-devs command executed at the ok prompt, the prtconf command displays the devices that are configured.

The prtconf command identifies hardware that is recognized by the Solaris OS. If software applications are having problems with hardware but the hardware is not suspected of being faulty, the prtconf command can be used to check whether the Solaris software recognizes the hardware and whether a driver for the hardware is loaded.

3.6.3.1 Options

TABLE 3-9 lists the options of the `prtconf` command and how those options can help troubleshooting.

TABLE 3-9 Options for `prtconf`

Option	Description	How it can help
No option	Displays the device tree of devices recognized by the operating system.	If a hardware device is recognized, then it is considered to be functioning properly. If the message "(driver not attached)" is displayed for the device or sub-device, then the driver for the device is corrupt or missing.
`-D`	Similar to the output of no option, but device driver names are listed.	Lists the drivers needed or used by the operating system to enable the device.
`-p`	Similar to the output of no option, yet is abbreviated.	Provides a brief list of the devices.
`-V`	Displays the version and date of the OpenBoot™ PROM firmware.	Useful for a quick check of the firmware version.

The following example shows output for the `prtconf` command:

```
# prtconf
System Configuration:  Sun Microsystems  sun4u
Memory size: 7616 Megabytes
System Peripherals (Software Nodes):

SUNW,SPARC-Enterprise
    scsi_vhci, instance #0
    packages (driver not attached)
        SUNW,probe-error-handler (driver not attached)
        SUNW,builtin-drivers (driver not attached)
        deblocker (driver not attached)
        disk-label (driver not attached)
        terminal-emulator (driver not attached)
        obp-tftp (driver not attached)
        ufs-file-system (driver not attached)
    chosen (driver not attached)
    openprom (driver not attached)
        client-services (driver not attached)
    options, instance #0
    aliases (driver not attached)
    memory (driver not attached)
    virtual-memory (driver not attached)
    pseudo-console, instance #0
```

The `prtconf` output continued:

```
    nvram (driver not attached)
    pseudo-mc, instance #0
    cmp (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
    pci, instance #0
        ebus, instance #0
            flashprom (driver not attached)
            serial, instance #0
            scfc, instance #0
            panel, instance #0
    pci, instance #0
        pci, instance #0
            pci, instance #1
                scsi, instance #0
                    tape (driver not attached)
                    disk (driver not attached)
                    sd, instance #1
                    sd, instance #0
            pci, instance #2
                pci, instance #0
                    network, instance #0
                    network, instance #1 (driver not attached)
            pci, instance #3
                pci, instance #1
                    network, instance #2 (driver not attached)
                    network, instance #3 (driver not attached)
            pci, instance #4
    pci, instance #1
        pci, instance #5
            pci, instance #6
            pci, instance #7
            pci, instance #8
    os-io (driver not attached)
    iscsi, instance #0
```

The `prtconf` output continued:

```
    pseudo, instance #0
#
```

3.6.4 Using the `netstat` Command

The `netstat` command displays the network status and protocol statistics.

3.6.4.1 Options

TABLE 3-10 lists the options of the `netstat` command and how those options can help troubleshooting.

TABLE 3-10 Options for `netstat`

Option	Description	How it can help
`-i`	Displays the interface status. The information includes packets in/out, errors in/out, collisions, and queues.	Provides a quick overview of the network status.
`-i` *interval*	Repeats the `setstat` command in the intervals of as many seconds as specified after the `-i` option.	Identifies intermittent or long duration network events. By piping `setstat` output to a file, overnight activity can be viewed all at once.
`-p`	Displays the media table.	Provides the MAC address for hosts on the subnet.
`-r`	Displays the routing table.	Provides routing information.
`-n`	Replaces host names with IP addresses and displays them.	Used when an IP address is more useful than a host name.

The following example shows the output for the `netstat -p` command:

```
# netstat -p
Net to Media Table: IPv4
Device   IP Address               Mask      Flags      Phys Addr
------ -------------------- --------------- -------- ---------------
bge0   san-ff1-14-a         255.255.255.255 o        00:14:4f:3a:93:61
bge0   san-ff2-40-a         255.255.255.255 o        00:14:4f:3a:93:85
sppp0  224.0.0.22           255.255.255.255
bge0   san-ff2-42-a         255.255.255.255 o        00:14:4f:3a:93:af
bge0   san09-lab-r01-66     255.255.255.255 o        00:e0:52:ec:1a:00
sppp0  192.168.1.1          255.255.255.255
bge0   san-ff2-9-b          255.255.255.255 o        00:03:ba:dc:af:2a
bge0   bizzaro              255.255.255.255 o        00:03:ba:11:b3:c1
bge0   san-ff2-9-a          255.255.255.255 o        00:03:ba:dc:af:29
bge0   racerx-b             255.255.255.255 o        00:0b:5d:dc:08:b0
bge0   224.0.0.0            240.0.0.0       SM       01:00:5e:00:00:00
#
```

3.6.5 Using the `ping` Command

The `ping` command sends an ICMP ECHO_REQUEST packet to a network host. Depending on how the `ping` command is configured, troublesome network links or nodes can be identified from the displayed output. The destination host is specified in the variable hostname.

3.6.5.1 Options

TABLE 3-11 lists the options of the `ping` command and how those options can help troubleshooting.

TABLE 3-11 Options for `ping`

Option	Description	How it can help
hostname	The probe packet is sent to *hostname* and returned.	Verifies that a host is active on the network.
`-g` *hostname*	Forcibly routes the probe packet through a specified gateway.	By sending the probe packet through different routes to the target host, individual routes can be tested for quality.
`-i` *interface*	Specifies through which *interface* to send and receive the probe packet.	Enables a simple check of secondary network interfaces.

TABLE 3-11 Options for `ping` *(Continued)*

Option	Description	How it can help
`-n`	Replaces host names with *IP addresses* and displays them.	Used when an *IP address* is more useful than a host name.
`-s`	Continues to repeat `ping` at intervals of 1 second. Pressing CTRL-C stops the execution. After it is stopped, statistics are displayed.	Helps identify intermittent or long duration network events. By piping `ping` output to a file, overnight activity can be viewed all at once.
`-svR`	Displays the route the probe packet followed in 1-second intervals.	Indicates the probe packet route and number of hops. Comparing multiple routes can identify bottlenecks.

The following example shows output for the `ping -s` command:

```
#  ping -s san-ff2-17-a
PING san-ff2-17-a: 56 data bytes
64 bytes from san-ff2-17-a (10.1.67.31): icmp_seq=0. time=0.427 ms
64 bytes from san-ff2-17-a (10.1.67.31): icmp_seq=1. time=0.194 ms
^C
----san-ff2-17-a PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max/stddev = 0.172/0.256/0.427/0.102
#
```

3.6.6 Using the `ps` Command

The `ps` commands lists the status of processes. If no option is specified, the `ps` command outputs information about the processes that have the same execution *user ID* as the user who is executing this command and are controlled from the same control terminal as this command.

If any option is specified, the output information is controlled according to the specified option.

3.6.6.1 Options

TABLE 3-12 lists the options of the `ps` command and how those options can help troubleshooting.

TABLE 3-12 Options for `ps`

Option	Description	How it can help
`-e`	Displays information for every process.	Identifies the process ID and the executable files.
`-f`	Generates a full listing.	Provides the following process information: user ID, parent process ID, time when executed, and the paths to the executable files.
`-o` option	Enables configurable output. The pid, pcpu, pmem, and comm options display process ID, percent CPU consumption, percent memory consumption, and the relevant executable file, respectively.	Provides only most important information. Knowing the percentage of resource consumption helps identify processes that are affecting performance and might be hung.

The following example shows output for the `ps` command:

```
# ps
    PID TTY          TIME CMD
101042 pts/3       0:00 ps
101025 pts/3       0:00 sh
#
```

When using sort with the `-r` option, the column headings are output so that the value in the first column is equal to zero.

3.6.7 Using the `prstat` Command

The `prstat` utility repeatedly examines all the active processes in the system and reports statistics based on the selected output mode and sort order. The `prstat` command provides output similar to the `ps` command.

3.6.7.1 Options

TABLE 3-13 lists the options of the `prstat` command and how those options can help troubleshooting.

TABLE 3-13 Options for `prstat`

Option	Description	How it can help
No option	Displays a list of the processes sorted in descending order of consumption amount of CPU resources. The list is limited to the height of the terminal window and the total number of processes. Output is automatically updated every 5 seconds. Pressing CTRL-C stops the execution.	Output identifies the process ID, user ID, used amount of memory, state, CPU consumption, and command name.
`-n` *number*	Limits the number of output lines.	Limits the amount of data displayed and displays processes consuming many resources.
`-s` *key*	Enables the sorting of list contents by key parameter.	Useful keys are cpu (default), time, and size.
`-v`	Verbose mode	Displays additional parameters.

The following example shows output for the `prstat` command:

```
# prstat -n 5 -s size
   PID USERNAME  SIZE  RSS STATE  PRI NICE   TIME  CPU  PROCESS/NLWP
100463 root     66M   61M sleep   59    0  0:01:03 0.0% fmd/19
100006 root     11M 9392K sleep   59    0  0:00:09 0.0% svc.configd/16
100004 root     10M 8832K sleep   59    0  0:00:04 0.0% svc.startd/14
100061 root   9440K 6624K sleep   59    0  0:00:01 0.0% snmpd/1
100132 root   8616K 5368K sleep   59    0  0:00:04 0.0% nscd/35
Total: 52 processes, 188 lwps, load averages: 0.00, 0.00, 0.00
#
```

CHAPTER 4

FRU Replacement Preparation

This chapter explains the method of preparing for the safe replacement of FRUs.

- Section 4.1, "Tools Required for Maintenance" on page 4-1
- Section 4.2, "FRU Replacement and Installation Methods" on page 4-2
- Section 4.3, "Active Replacement/Active Addition" on page 4-5
- Section 4.4, "Hot Replacement/Hot Addition" on page 4-7
- Section 4.5, "Cold Replacement/Cold Addition" on page 4-12

4.1 Tools Required for Maintenance

The actual maintenance work described in Chapter 5 to Chapter 15 requires maintenance software to confirm that the server and other components are operating correctly and to collect status information and log data on the server and components. Work for mounting, removing, or replacing a specific component requires special tools, including screwdrivers and an antistatic wrist strap. These items are generally named maintenance tools and are listed in TABLE 4-1.

TABLE 4-1 Maintenance Tools

Item	Part name	Use
1	Phillips screwdriver (No. 2)	
2	Wrist strap	For electrostatic control
3	Conductive mat	For electrostatic control
4	SunVTS	Test program

4.2 FRU Replacement and Installation Methods

This section explains how to replace and install FRUs.

4.2.1 FRU Replacement

There are three methods of replacing FRUs, as follows:

- Active replacement

  A target FRU is operated while the Solaris OS of the domain to which the FRU belongs is operating.

  The target FRU is operated by using Solaris OS commands or XSCF commands.

  Because the power supply unit (PSU) and fan unit (FAN) do not belong to any domain, they are operated by using XSCF commands regardless of the operating state of the Solaris OS.

Note – The hard disk drive has a redundant configuration only when disk mirroring software is used.

Note – If a hard disk drive is an unmirrored boot device, it must be replaced by using the cold replacement procedure. However, if a boot device can be disconnected by means of a Solaris OS function or disk mirroring software function, active replacement can also be performed. The procedure for disconnecting a hard disk drive varies depending on the software being used. For details, see the manuals for the relevant software.

- Hot replacement

  A target FRU is operated while the domain to which the FRU belongs is stopped.

  Depending on the target FRU, there are two cases as follows:

  - Power supply unit/Fan unit: operated with XSCF commands.
  - Hard disk drive: operated directly, not by using XSCF commands.

- Cold replacement

  After all the domains are stopped and then the server is powered off, a FRU is operated.

Note – Do not operate a target FRU while the OpenBoot PROM is running (the ok prompt is displayed). After stopping the relevant domain (power-off) or starting the Solaris OS, operate the target FRU.

4.2.2 FRU Installation

For empty slots without hard disk drives or PCIe cards, the number of mounted FRUs can be changed from 1 to the maximum number as required. There are some components that are tentatively mounted physically in the server. If such a component is a hard disk drive, it is called an HDD dummy, and if such a component is a PCIe card, it is called a PCIe slot cover. These components are necessary to protect the server from noise and to properly cool the server.

The same methods as those used for replacement are used for installation.

Note – When installing a new component in an empty slot, remove the HDD dummy or PCIe slot cover and then install a new FRU.

TABLE 4-2 lists the access locations and applicable replacement methods for each FRU.

TABLE 4-2 FRU Access Locations and Replacement Methods

FRU	Access location	Cold replacement	Hot replacement	Active replacement	Where to find the procedure
Motherboard unit (MBU_A, MBU_A_2, MBU_A_3, MBU_A_4)	Top	Yes	No	No	Chapter 6
Memory (DIMM)	Top	Yes	No	No	Chapter 7
PCIe card (PCIe)	Top	Yes	No	No	Chapter 8
Hard disk drive (HDD)	Front	Yes	Yes *	Yes ‡	Chapter 9
Hard disk drive backplane (HDDBP)	Top	Yes	No	No	Chapter 10
CD-RW/DVD-RW drive unit (DVDU)	Front/top	Yes	No	No	Chapter 11
Power supply unit (PSU)	Rear	Yes	Yes †	Yes †	Chapter 12

TABLE 4-2 FRU Access Locations and Replacement Methods *(Continued)*

FRU	Access location	Cold replacement	Hot replacement	Active replacement	Where to find the procedure
Fan unit (FAN_A)	Top	Yes	Yes †	Yes †	Chapter 13
Fan backplane (FANBP_B)	Top	Yes	No	No	Chapter 14
Operator panel (OPNL)	Front/top	Yes	No	No	Chapter 15

* The FRU is operated directly, without using XSCF commands.

† The FRU is operated with XSCF commands.

‡ ■ The hard disk drive has a redundant configuration only when disk mirroring software is used.
■ If a hard disk drive is an unmirrored boot device, it must be replaced by using the cold replacement procedure. However, if a boot device can be disconnected by means of a Solaris OS function or disk mirroring software function, active replacement can also be performed. The procedure for disconnecting a hard disk drive varies depending on the software being used. For details, see the manuals for the relevant software.

TABLE 4-3 lists the access location and applicable installation methods for each FRU.

TABLE 4-3 FRU Access Locations and Installation Methods

FRU	Access location	Cold addition	Hot addition	Active addition	Where to find the procedure
Motherboard unit (MBU_A, MBU_A_2, MBU_A_3, MBU_A_4)	Top	No	No	No	
Memory (DIMM)	Top	Yes	No	No	Chapter 7
PCIe card (PCIe)	Top	Yes	No	No	Chapter 8
Hard disk drive (HDD)	Front	Yes	Yes *	Yes†	Chapter 9
Hard disk drive backplane (HDDBP)	Top	No	No	No	
CD-RW/DVD-RW drive unit (DVDU)	Front/top	No	No	No	
Power supply unit (PSU)	Rear	No	No	No	
Fan unit (FAN_A)	Top	No	No	No	
Fan backplane (FANBP_B)	Top	No	No	No	
Operator panel (OPNL)	Front/top	No	No	No	

* The FRU is operated directly, without using XSCF commands.

† The FRU is operated with XSCF commands.

4.3 Active Replacement/Active Addition

In active replacement, the target FRU is operated while the Solaris OS of the domain to which the FRU belongs is operating.

The target FRU is operated using Solaris OS commands or XSCF commands.

Because the power supply unit (PSU) and fan unit (FAN) do not belong to any domain, they are operated by using XSCF commands regardless of the operating state of the Solaris OS.

Active replacement has the following four stages:

- "Releasing a FRU from a Domain" on page 4-5
- "FRU Removal and Replacement" on page 4-6
- "Configuring a FRU in a Domain" on page 4-6
- "Verifying the Hardware Operation" on page 4-7

For active installation, see Section 4.3.3, "Configuring a FRU in a Domain" on page 4-6 and "Section 4.3.4, "Verifying the Hardware Operation" on page 4-7.

4.3.1 Releasing a FRU from a Domain

1. **From the Solaris OS, type the `cfgadm` command to obtain the component status.**

```
# cfgadm -a
```

2. **Stop the application from using the component and disconnect the component from the Solaris OS.**

   The READY LED (green) of the HDD goes off.

Note – If a hard disk drive is an unmirrored boot device, it must be replaced by using the cold replacement procedure. However, if a boot device can be disconnected by means of a Solaris OS function or disk mirroring software function, active replacement can also be performed.

---

3. **Type the `cfgadm -c` command to disconnect the component from the Solaris OS.**

```
# cfgadm -c unconfigure Ap_Id
```

4. **Type the `cfgadm -x` command to confirm that the CHECK LED blinks.**

```
# cfgadm -x led=fault, mode=blink Ap_Id
```

The *Ap_Id* is shown in the output of `cfgadm` (for example, *disk#0*).

The CHECK LED (amber) of the HDD blinks.

5. **Type the `cfgadm` command to verify that the component has been disconnected.**

```
# cfgadm -a
```

The disconnected component is displayed as being unconfigured.

4.3.2 FRU Removal and Replacement

After the disconnection of a FRU from a domain, the same procedure as that for Hot Replacement/Hot Addition applies. See Section 4.4, "Hot Replacement/Hot Addition" on page 4-7.

4.3.3 Configuring a FRU in a Domain

This section explains the procedure for active replacement/installation by using Solaris OS commands. For information on using the XSCF command, see Section 4.4, "Hot Replacement/Hot Addition" on page 4-7.

1. **Type the `cfgadm -c` command from the Solaris OS to integrate the component into the Solaris OS.**

```
# cfgadm -c configure Ap_Id
```

2. **Type the `cfgadm -x` command to confirm that the CHECK LED is off.**

```
# cfgadm -x led=fault, mode=off Ap_Id
```

The *Ap_Id* is shown in the output of `cfgadm` (for example, disk#0).

The CHECK LED (amber) of the HDD is turned off.

3. **Type the `cfgadm` command to verify that the component has been configured.**

```
# cfgadm -a
```

The configured component is displayed as being configured.

The READY LED (green) of the HDD goes on.

4.3.4 Verifying the Hardware Operation

- Confirm the status of the LED indicators.

  For information on the LED status, see TABLE 2-3 and TABLE 2-5.

4.4 Hot Replacement/Hot Addition

In hot replacement, the target FRU is operated while the domain to which the FRU belongs is stopped.

Depending on the target FRU, there are two cases as follows:

- Power supply unit/Fan unit: operated with XSCF commands.
- Hard disk drive: operated directly, not by using XSCF commands.

For hot addition, do the same operation as that for hot replacement.

4.4.1 FRU Removal and Replacement

- **Type the `replacefru` command from the XSCF Shell prompt.**

```
XSCF> replacefru
------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
------------------------------------------------------------------------
Select [1,2|c:cancel] :1

------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a FAN to be replaced.

No. FRU             Status
--- --------------- ------------------
 1. FAN_A#0         Normal
 2. FAN_A#1         Normal
------------------------------------------------------------------------
Select [1,2|b:back] :1

You are about to replace FAN_A#0.
Do you want to continue?[r:replace|c:cancel] :r

Please confirm the Check LED is blinking.
If this is the case, please replace FAN_A#0.
After replacement has been completed, please select[f:finish] :f
```

The `replacefru` command automatically tests the status of the component after the completion of removal and replacement.

```
Diagnostic tests for FAN_A#0 have started.
[This operation may take up to 3 minute(s)]
(progress scale reported in seconds)
   0.....  30..done
------------------------------------------------------------------------
Maintenance/Replacement Menu
Status of the replaced FRU.

FRU           Status
------------- --------
FAN_A#0       Normal
------------------------------------------------------------------------
The replacement of FAN_A#0 has completed normally.[f:finish] :f

------------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
------------------------------------------------------------------------
Select [1,2|c:cancel] :c
```

The display may vary depending on the XCP version

When the tests are complete, the program displays the original menu again. To return to the XSCF Shell prompt, select cancel.

For details, see the manual pages of `replacefru`.

4.4.2 Verifying the Hardware Operation

1. **Type the** `showhardconf` **command to confirm that the new component has been installed.**

```
XSCF> showhardconf
SPARC Enterprise M3000;
    + Serial:IKK0813023; Operator_Panel_Switch:Locked;
    + Power_Supply_System:Single; SCF-ID:XSCF#0;
    + System_Power:On; System_Phase:Cabinet Power On;
    Domain#0 Domain_Status:OpenBoot Execution Completed;

    MBU_A Status:Normal; Ver:0101h; Serial:PP082202QX  ;
        + FRU-Part-Number:CA07082-D901 A1   /541-3302-01          ;
        + CPU Status:Normal;
            + Freq:2.520 GHz; Type:32;
            + Core:4; Strand:2;
        + Memory_Size:8 GB;
        MEM#0A Status:Normal;
            + Code:ce00000000000000001M3 93T2950EZA-CE6 4145-473b3c23;
            + Type:1A; Size:1 GB;
        MEM#0B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2918;
            + Type:1A; Size:1 GB;
        MEM#1A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28af;
            + Type:1A; Size:1 GB;
        MEM#1B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28ab;
            + Type:1A; Size:1 GB;
        MEM#2A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b283e;
            + Type:1A; Size:1 GB;
        MEM#2B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2829;
            + Type:1A; Size:1 GB;
        MEM#3A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2840;
            + Type:1A; Size:1 GB;
        MEM#3B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2830;
            + Type:1A; Size:1 GB;
        PCI#0 Name_Property:fibre-channel; Card_Type:Other;
        PCI#1 Name_Property:fibre-channel; Card_Type:Other;
        PCI#2 Name_Property:pci; Card_Type:Other;
        PCI#3 Name_Property:pci; Card_Type:Other;
```

The `showhardconf` output continued:

```
    OPNL Status:Normal; Ver:0101h; Serial:PP082202R8  ;
        + FRU-Part-Number:CA07082-D911 A1   /541-3306-01          ;
    PSU#0 Status:Normal; Serial:EA08210127;
        + FRU-Part-Number:CA01022-0720 02B  /300-2193-02   ;
        + Power_Status:On;
        + Type:AC;
    PSU#1 Status:Normal; Serial:EA08210131;
        + FRU-Part-Number:CA01022-0720 02B  /300-2193-02   ;
        + Power_Status:On;
        + Type:AC;
    FANBP_B Status:Normal; Ver:0101h; Serial:PP0821031E  ;
        + FRU-Part-Number:CA20399-B12X 004AA/541-3304-01          ;
        FAN_A#0 Status:Normal;
        FAN_A#1 Status:Normal;
XSCF>
```

For details, see the manual pages of `showhardconf`.

2. **Confirm the state of the status LEDs of the FRU.**

   For information on the LED status, see TABLE 2-3 and TABLE 2-5.

4.5 Cold Replacement/Cold Addition

In cold replacement, all business operations must be stopped. When accessing the server, power off the server and disconnect the power cord to ensure safety.

For cold addition, do the same operation as that for cold replacement.

4.5.1 Powering off the Server

This section explains how to power off the server.

4.5.1.1 Power-off by Using the XSCF Command

1. **Notify users that the server is being powered off.**
2. **Back up the system files and data to tape, if necessary.**
3. **A user with** `platadm` **or** `fieldeng` **authority must log in to the XSCF Shell and enter the** `poweroff` **command.**

```
XSCF> poweroff -a
```

The following activity is executed when the `poweroff` command is used:

- The Solaris OS shuts down completely.
- The server is powered off and the server enters standby mode. (The power to the XSCF unit remains on.)

For details, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

4. **Verify that the POWER LED on the operator panel is off.**
5. **Disconnect all the power cords from the power outlets.**

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

4.5.1.2 Power off by Using the Operator Panel

1. **Notify users that the server is being powered off.**
2. **Back up the system files and data to tape, if necessary.**
3. **Turn the mode switch on the operator panel to the Service position.**
4. **Press the power switch on the operator panel for 4 seconds or more.**
5. **Verify that the POWER LED on the operator panel is off.**
6. **Disconnect all the power cords from the power outlets.**

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

4.5.2 FRU Removal and Replacement

In cold replacement, a FRU is removed and replaced while the power is turned off. After the FRU replacement, power on the server.

4.5.3 Powering on the Server

This section explains how to power on the server.

4.5.3.1 Power-on by Using the XSCF Command

1. **Verify that the server has enough power supply units to operate in the desired configuration.**
2. **Connect all the power cords to power outlets.**
3. **Verify that the XSCF STANDBY LED on the operator panel is on.**
4. **Turn the mode switch on the operator panel to the desired mode position (Locked or Service).**

5. **A user with** `platadm` **or** `fieldeng` **authority must log in to the XSCF Shell and type the** `poweron` **command.**

```
XSCF> poweron -a
```

Soon, the following activity is executed:

- The POWER LED on the operator panel is turned on.
- The power-on self-test (POST) is executed.

Then, the server is completely powered on.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

For details, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

4.5.3.2 Power-on by Using the Operator Panel

1. **Verify that the server has enough power supply units to operate in the desired configuration.**
2. **Connect all the power cords to power outlets.**
3. **Verify that the XSCF STANDBY LED on the operator panel is on.**
4. **Turn the mode switch on the operator panel to the desired mode position (Locked or Service).**
5. **Press the power button on the operator panel.**

   Soon, the following activity is executed:

   - The POWER LED on the operator panel is turned on.
   - The power-on self-test (POST) is executed.

   Then, the server is completely powered on.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

4.5.4 Verifying the Hardware Operation

1. **In response to the** `ok` **prompt, press the** ENTER **key and enter "#" (default value) and then press the "." (period) key.**

   The domain console is switched to the XSCF console.

2. **Use the** `showhardconf` **command to confirm that the new component has been installed.**

```
XSCF> showhardconf
SPARC Enterprise M3000;
    + Serial:IKK0813023; Operator_Panel_Switch:Locked;
    + Power_Supply_System:Single; SCF-ID:XSCF#0;
    + System_Power:On; System_Phase:Cabinet Power On;
    Domain#0 Domain_Status:OpenBoot Execution Completed;

    MBU_A Status:Normal; Ver:0101h; Serial:PP082202QX  ;
        + FRU-Part-Number:CA07082-D901 A1   /541-3302-01          ;
        + CPU Status:Normal;
            + Freq:2.520 GHz; Type:32;
            + Core:4; Strand:2;
        + Memory_Size:8 GB;
        MEM#0A Status:Normal;
            + Code:ce000000000000001M3 93T2950EZA-CE6 4145-473b3c23;
            + Type:1A; Size:1 GB;
        MEM#0B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2918;
            + Type:1A; Size:1 GB;
        MEM#1A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28af;
            + Type:1A; Size:1 GB;
        MEM#1B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28ab;
            + Type:1A; Size:1 GB;
        MEM#2A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b283e;
            + Type:1A; Size:1 GB;
        MEM#2B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2829;
            + Type:1A; Size:1 GB;
        MEM#3A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2840;
            + Type:1A; Size:1 GB;
        MEM#3B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2830;
            + Type:1A; Size:1 GB;
        PCI#0 Name_Property:fibre-channel; Card_Type:Other;
        PCI#1 Name_Property:fibre-channel; Card_Type:Other;
```

The showhardconf output continued:

```
        PCI#2 Name_Property:pci; Card_Type:Other;
        PCI#3 Name_Property:pci; Card_Type:Other;
    OPNL Status:Normal; Ver:0101h; Serial:PP082202R8  ;
        + FRU-Part-Number:CA07082-D911 A1   /541-3306-01          ;
    PSU#0 Status:Normal; Serial:EA08210127;
        + FRU-Part-Number:CA01022-0720 02B  /300-2193-02   ;
        + Power_Status:On;
        + Type:AC;
    PSU#1 Status:Normal; Serial:EA08210131;
        + FRU-Part-Number:CA01022-0720 02B  /300-2193-02   ;
        + Power_Status:On;
        + Type:AC;
    FANBP_B Status:Normal; Ver:0101h; Serial:PP0821031E  ;
        + FRU-Part-Number:CA20399-B12X 004AA/541-3304-01          ;
        FAN_A#0 Status:Normal;
        FAN_A#1 Status:Normal;
XSCF>
```

For details, see the manual pages of showhardconf.

3. **Type the** console **command to switch from the XSCF console to the** ok **prompt (domain console) again:**

```
XSCF> console -d 0
```

4. **From the** ok **prompt, type the** show-devs **command to confirm that all the PCIe cards are mounted.**

```
{0} ok show-devs
/pci@1,700000
/pci@0,600000
/pci@8,4000
/cmp@400,0
/pseudo-mc@200,200
/nvram
/pseudo-console
/virtual-memory
/memory@m0
/aliases
/options
/openprom
/chosen
/packages
```

The `show-devs` output continued:

```
/pci@1,700000/pci@0
/pci@1,700000/pci@0/pci@9
/pci@1,700000/pci@0/pci@8
/pci@1,700000/pci@0/pci@0
/pci@1,700000/pci@0/pci@9/pci@0
/pci@1,700000/pci@0/pci@9/pci@0/FJSV,e2ta@4,1
/pci@1,700000/pci@0/pci@9/pci@0/FJSV,e2ta@4
/pci@1,700000/pci@0/pci@8/pci@0
/pci@1,700000/pci@0/pci@8/pci@0/FJSV,e2ta@4,1
/pci@1,700000/pci@0/pci@8/pci@0/FJSV,e2ta@4
/pci@1,700000/pci@0/pci@0/pci@0
/pci@1,700000/pci@0/pci@0/pci@0/FJSV,e2ta@4,1
/pci@1,700000/pci@0/pci@0/pci@0/FJSV,e2ta@4
/pci@0,600000/pci@0
/pci@0,600000/pci@0/pci@8
/pci@0,600000/pci@0/pci@2
/pci@0,600000/pci@0/pci@1
/pci@0,600000/pci@0/pci@0
/pci@0,600000/pci@0/pci@8/pci@0
/pci@0,600000/pci@0/pci@8/pci@0/FJSV,e2ta@4,1
/pci@0,600000/pci@0/pci@8/pci@0/FJSV,e2ta@4
/pci@0,600000/pci@0/pci@2/pci@0
/pci@0,600000/pci@0/pci@2/pci@0/network@4,1
/pci@0,600000/pci@0/pci@2/pci@0/network@4
/pci@0,600000/pci@0/pci@1/pci@0
/pci@0,600000/pci@0/pci@1/pci@0/network@4,1
/pci@0,600000/pci@0/pci@1/pci@0/network@4
/pci@0,600000/pci@0/pci@0/scsi@0
/pci@0,600000/pci@0/pci@0/scsi@0/disk
/pci@0,600000/pci@0/pci@0/scsi@0/tape
/pci@8,4000/ebus@1
/pci@8,4000/ebus@1/panel@14,280030
/pci@8,4000/ebus@1/scfc@14,200000
/pci@8,4000/ebus@1/serial@14,400000
/pci@8,4000/ebus@1/flashprom@10,0
/cmp@400,0/core@3
/cmp@400,0/core@2
/cmp@400,0/core@1
/cmp@400,0/core@0
/cmp@400,0/core@3/cpu@1
/cmp@400,0/core@3/cpu@0
/cmp@400,0/core@2/cpu@1
/cmp@400,0/core@2/cpu@0
/cmp@400,0/core@1/cpu@1
/cmp@400,0/core@1/cpu@0
```

The show-devs output continued:

```
/cmp@400,0/core@0/cpu@1
/cmp@400,0/core@0/cpu@0
/openprom/client-services
/packages/obp-tftp
/packages/terminal-emulator
/packages/disk-label
/packages/deblocker
/packages/SUNW,builtin-drivers
/packages/SUNW,probe-error-handler
{0} ok
```

5. **Type the** probe-scsi-all **command to confirm that the storage devices are mounted.**

```
{0} ok probe-scsi-all
/pci@0,600000/pci@0/pci@0/scsi@0

MPT Version 1.05, Firmware Version 1.24.00.00

Target 0
Unit 0   Disk     FUJITSU MAY2073RC       3701    143374738 Blocks, 73 GB
  SASAddress 500000e0197292c2  PhyNum 0
Target 1
Unit 0   Disk     FUJITSU MAY2073RC       3701    143374738 Blocks, 73 GB
  SASAddress 500000e019728f22  PhyNum 1
Target 2
Unit 0   Disk     FUJITSU MAY2073RC       3701    143374738 Blocks, 73 GB
  SASAddress 500000e019729002  PhyNum 2
Target 3
Unit 0   Disk     FUJITSU MAY2073RC       3701    143374738 Blocks, 73 GB
  SASAddress 500000e019729302  PhyNum 3
Target 4
Unit 0   Removable Read Only device     MATSHITADVD-RAM UJ875AS 1000
  SATA device  PhyNum 4

{0} ok
```

6. **Type the** boot **command to start the Solaris OS.**

```
ok boot
```

CHAPTER 5

Internal Components Access

This chapter explains how to access internal components.

- Section 5.1, "Sliding the Server Into and Out of the Equipment Rack" on page 5-1
- Section 5.2, "Removing and Attaching the Top Cover" on page 5-3
- Section 5.3, "Removing and Attaching the Air Duct" on page 5-4
- Section 5.4, "Removing and Attaching the Fan Cover" on page 5-7

5.1 Sliding the Server Into and Out of the Equipment Rack

This section explains how to slide the server out from the equipment rack and how to push it into the equipment rack.

For details of equipment racks, see the *SPARC Enterprise Equipment Rack Mounting Guide*.

5.1.1 Sliding the Server Out from the Equipment Rack

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

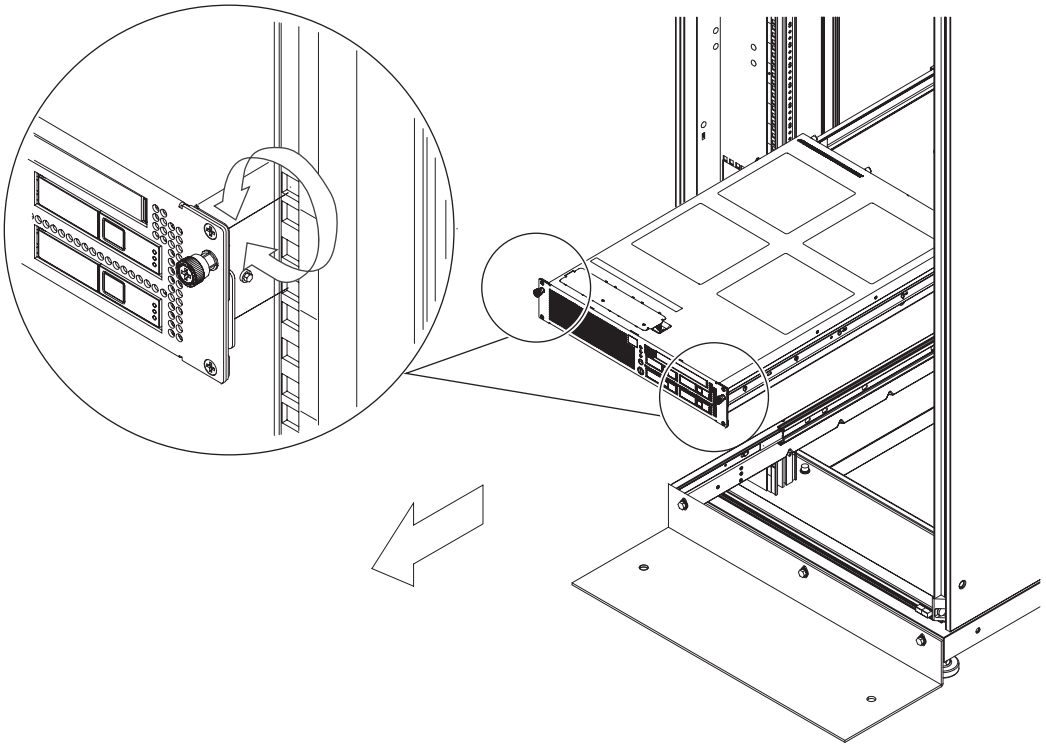
Note – If cable management arms are not attached, remove the cable ties securing the PCI cables to the rear of the server and slide the server out.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, be sure to install it.**
2. **Slide the server out as far as possible.**

   When the server is drawn out completely, the server is automatically locked in the predetermined position.
3. **Loosen the two screws at the front of the server (**FIGURE 5-1**).**

FIGURE 5-1 Pulling the Server Out from an Equipment Rack



4. **Slide the server out.**

5.1.2 Sliding the Server into the Equipment Rack

1. **Push the server back into the equipment rack.**
2. **Tighten the two screws at the front of the server to secure it in the equipment rack (**FIGURE 5-1**).**
3. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

5.2 Removing and Attaching the Top Cover

Caution – All internal components can be replaced in cold replacement mode. The server must be powered off and the power cord must be disconnected from the power supply. Before the top cover is removed, the server must be pulled out from the equipment rack. For the procedure for pulling the server out from the equipment rack, see Section 5.1, "Sliding the Server Into and Out of the Equipment Rack" on page 5-1.

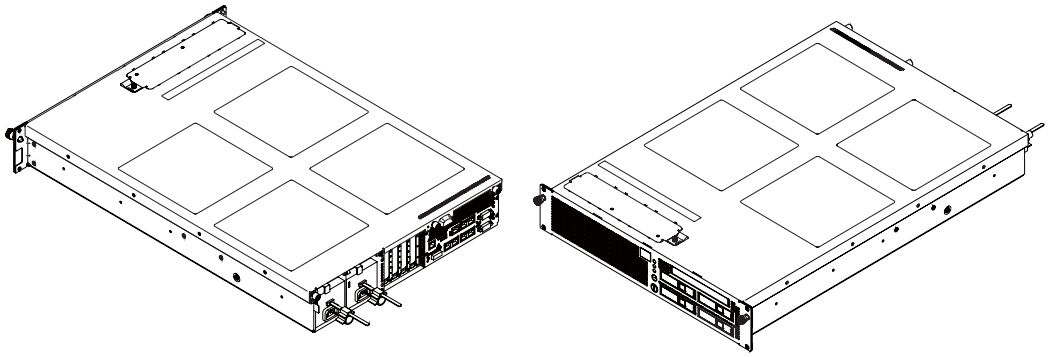
5.2.1 Removing the Top Cover

Caution – All internal components can be replaced in cold replacement mode. The server must be powered off and the power cord must be disconnected from the power supply.

1. **Loosen the three screws at the top rear of the server.**

2. **To remove the top cover, slide it toward the rear side and raise it (**FIGURE 5-2**).**

FIGURE 5-2 Removing the Top Cover



5.2.2 Attaching the Top Cover

1. **Align the top cover.**
2. **Tighten the three screws at the top rear of the server to secure the top cover in the predetermined position.**
3. **Push the server back into the equipment rack.**

For details, see "Section 5.1.2, “Sliding the Server into the Equipment Rack” on page 5-3.

5.3 Removing and Attaching the Air Duct

Caution – All internal components can be replaced in cold replacement mode. The server must be powered off and the power cord must be disconnected from the power supply. Before the top cover is removed, the server must be pulled out from the equipment rack.

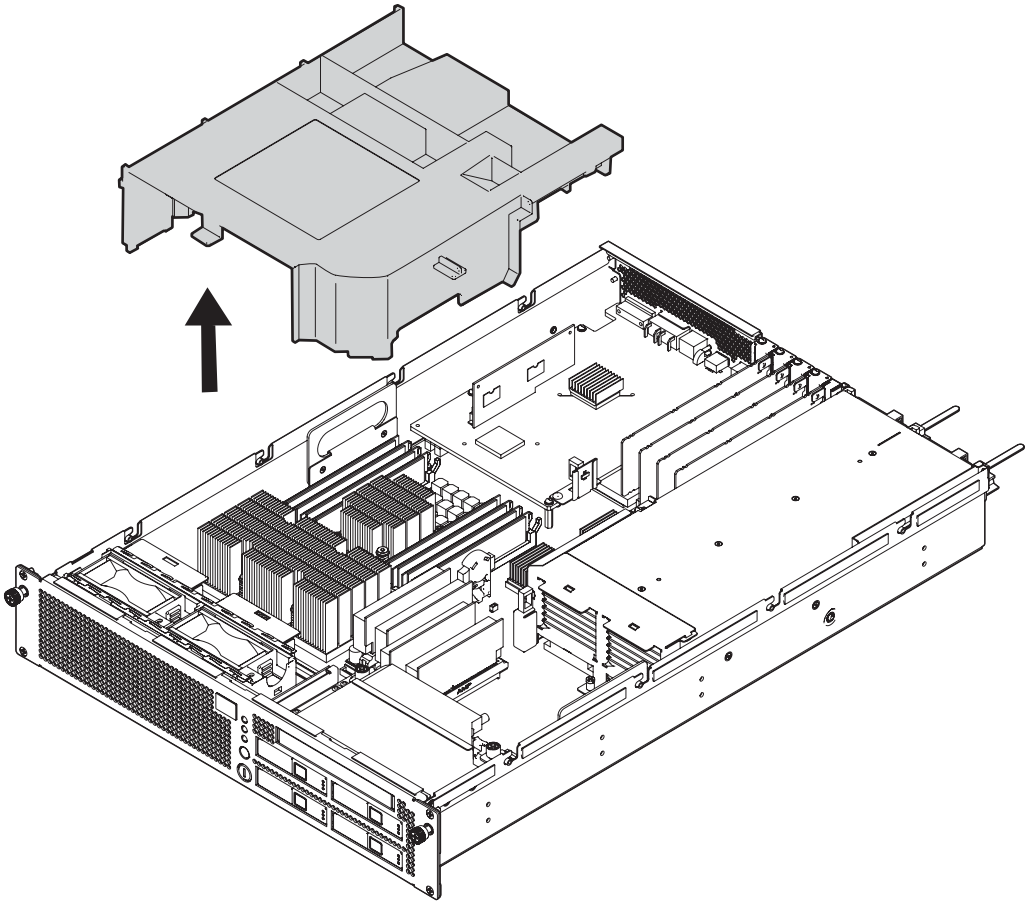
5.3.1 Accessing the Air Duct

Before the air duct is removed, the top cover must be removed. For details, see Section 5.2, “Removing and Attaching the Top Cover” on page 5-3

5.3.2 Removing the Air Duct

- Hold the air duct and lift it upwards.

FIGURE 5-3 Removing the Air Duct

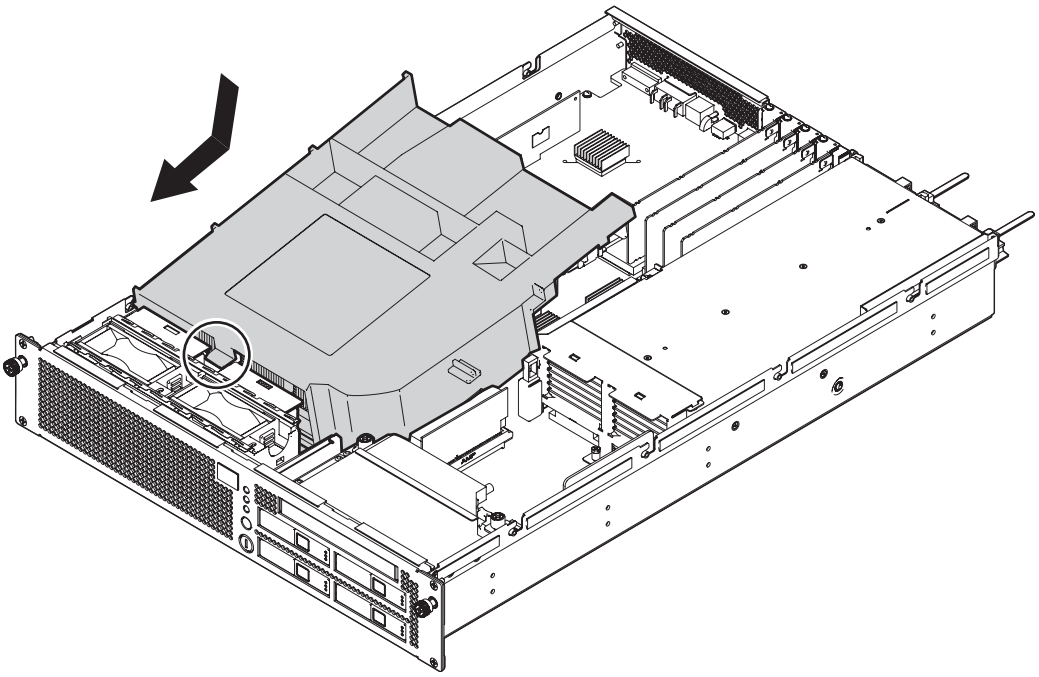


5.3.3 Attaching the Air Duct

- Set the tab at the front of the air duct in place and then lower the air duct (FIGURE 5-4).

  Prevent cables from interfering each other.

FIGURE 5-4 Attaching the Air Duct



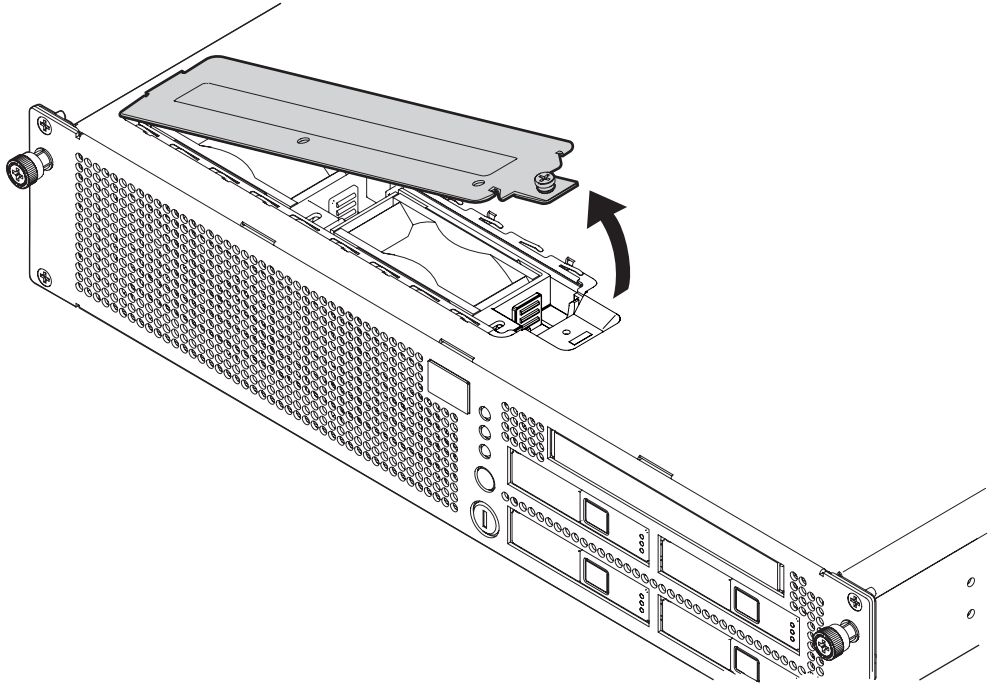
5.4 Removing and Attaching the Fan Cover

5.4.1 Removing the Fan Cover

Caution – Before the fan cover is removed, the server must be pulled out from the equipment rack. For the procedure for pulling the server out from the equipment rack, see "Section 5.1, “Sliding the Server Into and Out of the Equipment Rack” on page 5-1.

1. **Loosen one screw at the right of the fan cover.**
2. **Raise the right end of the fan cover and remove it (**FIGURE 5-5**).**

FIGURE 5-5 Removing the Fan Cover



5.4.2 Attaching the Fan Cover

1. **Align the tab on the left end of the fan cover in the predetermined position and then secure the fan cover in position.**
2. **Tighten the one screw on the right side of the fan cover.**
3. **Push the server back into the equipment rack.**

   For details, see Section 5.1.2, “Sliding the Server into the Equipment Rack” on page 5-3.

CHAPTER 6

Motherboard Unit Replacement

This chapter explains how to replace the motherboard unit.

- Section 6.1, "Accessing the Motherboard Unit" on page 6-4
- Section 6.2, "Removing the Motherboard Unit" on page 6-7
- Section 6.3, "Mounting the Motherboard Unit" on page 6-8
- Section 6.4, "Reassembling the Server" on page 6-9

The motherboard unit is a cold replacement component. The server must be completely powered off, the power cords must be disconnected, and all DIMMs and PCIe cards must be removed, before the motherboard unit is replaced. See Chapter 7, Replacement and Installation of Memory and Chapter 8, Replacement and Installation of PCIe Cards.

Note – There are two types of motherboard units for the M3000 server: the motherboard unit mounted with the CPU consisting of two-core processors and the motherboard unit mounted with the CPU consisting of four-core processors. When replacing a motherboard unit, the replacement unit must contain the same type of processor. For example, do not replace a motherboard unit that has two-core processors with one that contains four-core processors.

Note – When replacing the motherboard unit, use the same type of FRU as the FRU mounted on the previous motherboard unit. If you use a different type of FRU, it may not work properly.

Note – Do not replace the motherboard unit and the operator panel at the same time. Otherwise, the system may not operate correctly. Use the `showhardconf` command or `showstatus` command to verify that the replacement unit of the first replaced FRU is fully operational, before replacing the other FRU.

Note – When replacing the motherboard unit, attach connection destination labels to each of the LAN cable and UPS cable connected to the XSCF unit before removing these cables.

Note – When mounting the motherboard unit, connect the LAN cable and UPS cable to the XSCF unit.

Note – After the replacement of the motherboard unit is completed, the system clock must be reset. For details of the setting method, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

Note – After the replacement of the motherboard unit is completed, the versions of the XCP and Solaris OS must be checked. For details of version number checking and other such tasks, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

Because the XSCF unit is mounted on the motherboard unit, it cannot be replaced singly. For details of the XSCF unit, see the Appendix B.2.4.

FIGURE 6-1 indicates the location of the motherboard unit.

FIGURE 6-1 Motherboard Unit Location

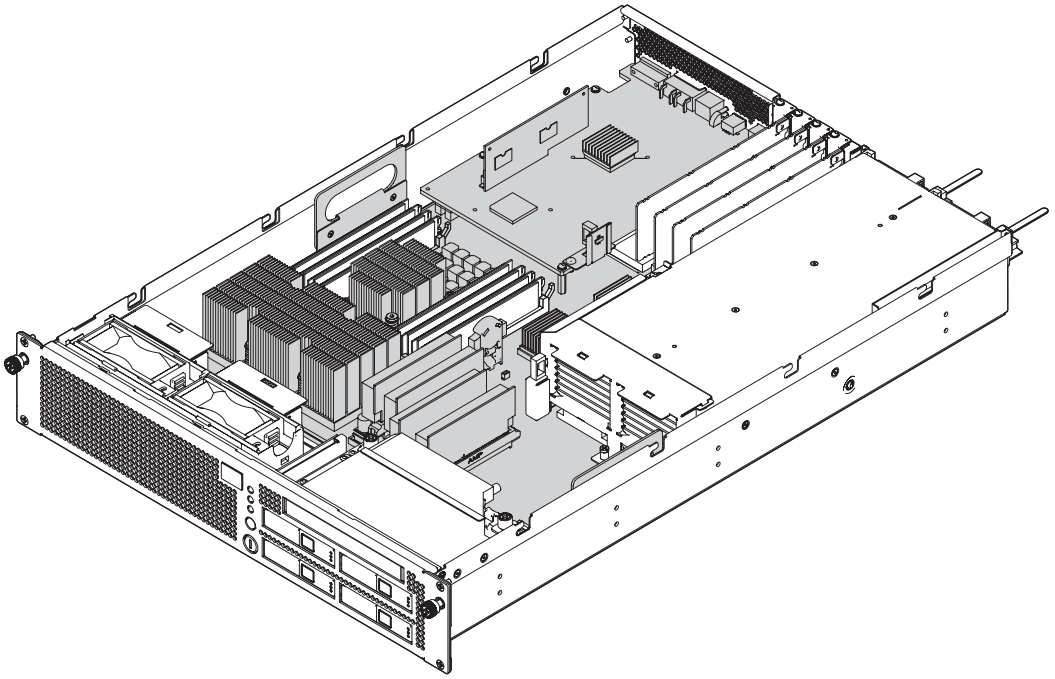
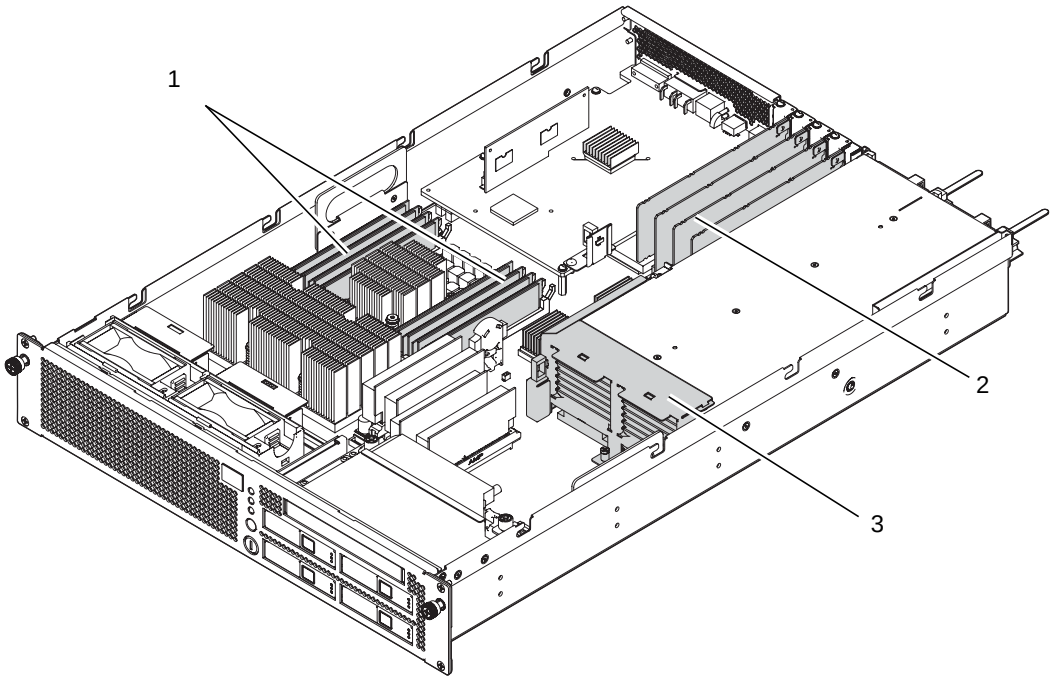


FIGURE 6-2 indicates the locations of DIMMs, PCIe cards, and shutter unit.

FIGURE 6-2 Locations of DIMMs, PCIe Cards, and Shutter Unit



Location number	Component
1	Memory (DIMM)
2	PCIe card
3	Shutter unit

6.1 Accessing the Motherboard Unit

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Remove all the cables from the external interface block on the rear panel.**

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Pull the power supply unit out several centimeters to the rear side.**
4. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

5. **Loosen the screws securing the cable management arm to the left rear of the server.**
6. **Pull the cable management arm out from the equipment rack.**
7. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

8. **Remove the PCIe cards.**

   For details, see Section 8.2, "Removing a PCIe Card" on page 8-4.

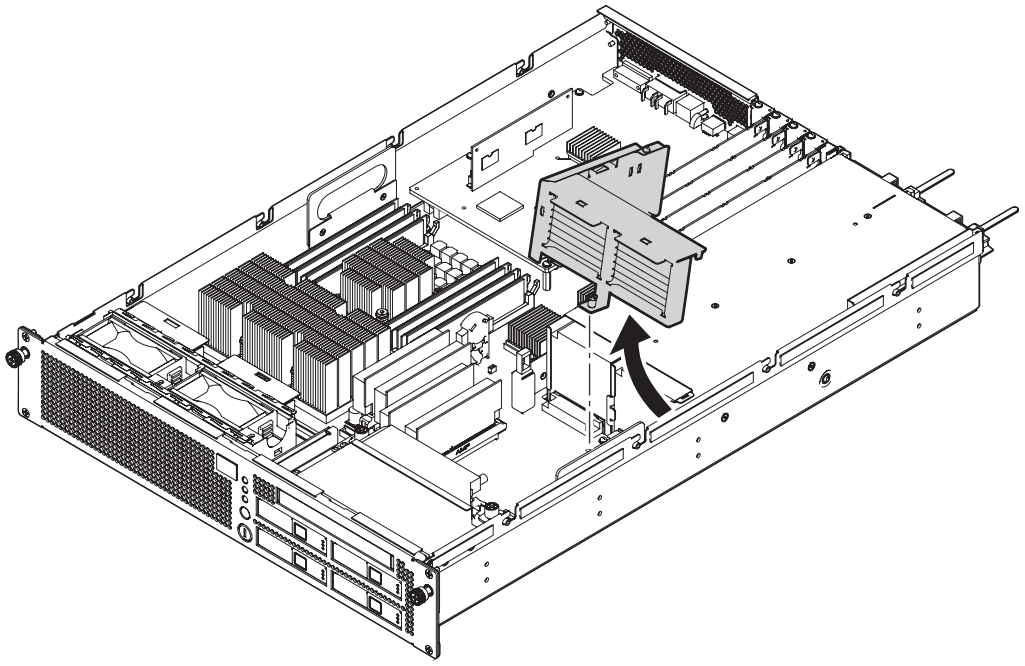
9. **Remove the air duct.**

   For details, see Section 5.3.2, "Removing the Air Duct" on page 5-5.

10. **Disconnect all the cables from the motherboard unit.**
11. **Loosen the two screws securing the shutter unit, and slide the securing bracket on the power supply unit.**

12. **Remove the shutter unit.**

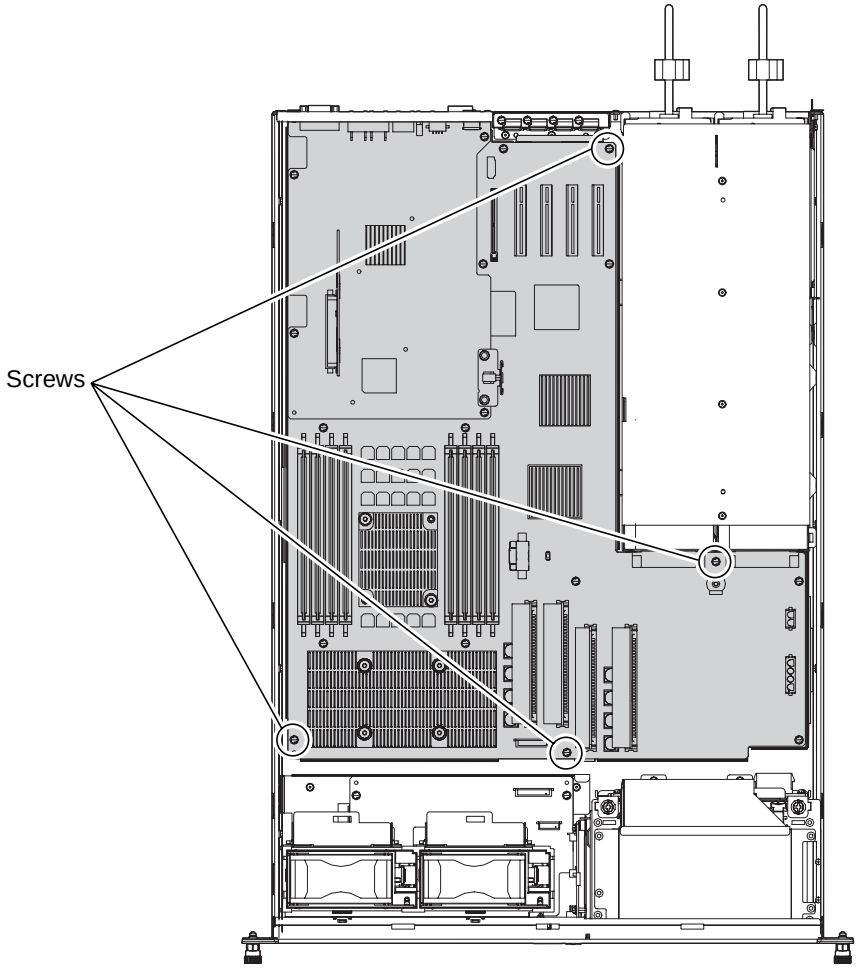
FIGURE 6-3 Removing the Shutter Unit



6.2 Removing the Motherboard Unit

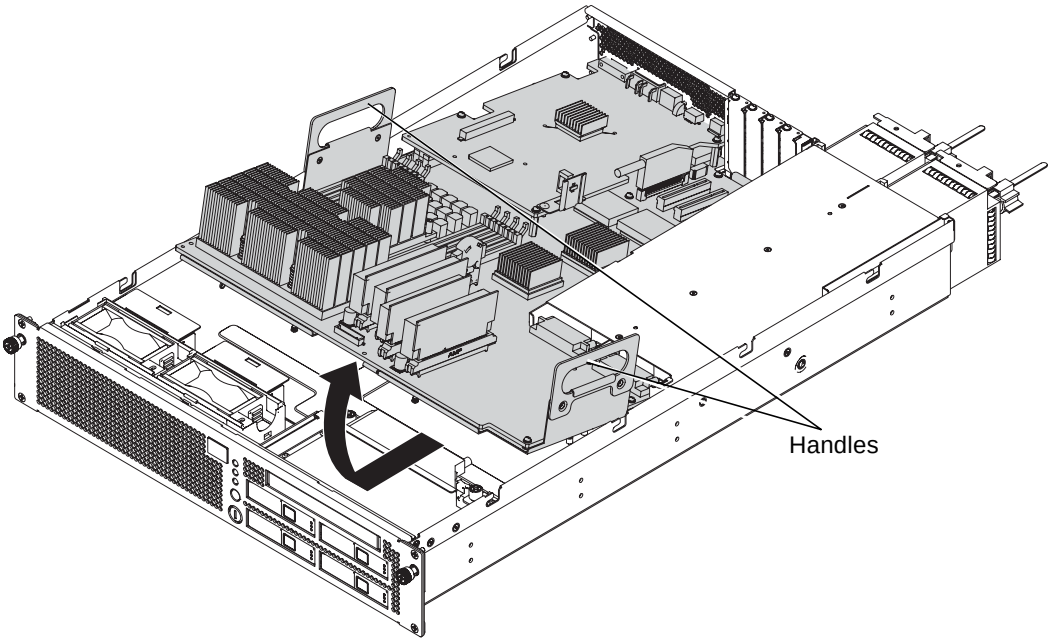
1. Remove the four screws securing the motherboard unit.

FIGURE 6-4 Securing Screw Locations on Motherboard Unit



2. **Hold the two opaque handles on both sides of the motherboard unit and lift the motherboard unit while sliding it out.**

FIGURE 6-5 Removing the Motherboard Unit



3. **Remove the motherboard unit from the server, and place it on a conductive mat.**

   When removing the motherboard unit from the server, take care not to damage the connector.

4. **Remove the DIMMs.**

   For details, see Section 7.3, "Removing the DIMMs" on page 7-8.

6.3 Mounting the Motherboard Unit

1. **Hold the two opaque handles on both sides of the motherboard unit and slide the unit in while lowering it to align with the predetermined position from the front of the server.**

   When mounting the motherboard unit in the server, take care not to damage the connector.

2. **Install and tighten the four screws to secure the motherboard unit in position.**

6.4 Reassembling the Server

1. **Align the shutter unit with the securing bracket on the power supply unit, and secure it with the two screws.**
2. **Mount the DIMMs.**

   For details, see Section 7.4, "Installing the DIMMs" on page 7-9.
3. **Reconnect all the cables to their original connection destinations on the motherboard unit.**
4. **Attach the air duct.**

   For details, see Section 5.3.3, "Attaching the Air Duct" on page 5-6.
5. **Mount the PCIe cards**

   For details, see Section 8.3, "Mounting a PCIe Card" on page 8-4.
6. **Attach the top cover.**

   For details, see Section 5.2.2, "Attaching the Top Cover" on page 5-4.
7. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.
8. **Mount the power supply unit correctly.**
9. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, "Power-on by Using the XSCF Command" on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

---

10. **Check the hardware.**

    This procedure includes the steps of running a program to verify that all the components have been remounted and starting the Solaris OS.

    For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 7

Replacement and Installation of Memory

This chapter explains how to replace and install memory (DIMMs).

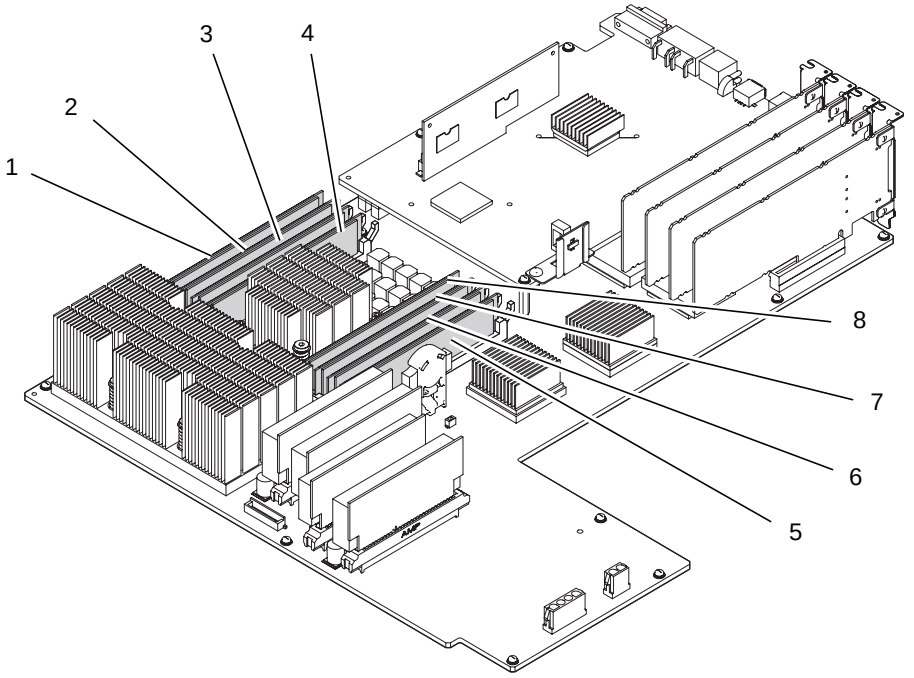
- Section 7.1, “Memory Mounting Rules” on page 7-3
- Section 7.2, “Accessing the DIMMs” on page 7-7
- Section 7.3, “Removing the DIMMs” on page 7-8
- Section 7.4, “Installing the DIMMs” on page 7-9
- Section 7.5, “Reassembling the Server” on page 7-9

DIMMs are cold replacement components. This means that the entire server must be powered off and the power cords must be disconnected to replace the DIMMs.

The same methods as those for replacement are used for installation of DIMMs.

FIGURE 7-1 shows the locations of DIMMs and memory slots.

FIGURE 7-1 Locations of DIMMs and Memory Slots



Location number	Component
1	MEM#00A, memory slot (group A)
2	MEM#00B, memory slot (group B)
3	MEM#01A, memory slot (group A)
4	MEM#01B, memory slot (group B)
5	MEM#02A, memory slot (group A)
6	MEM#02B, memory slot (group B)
7	MEM#03A, memory slot (group A)
8	MEM#03B, memory slot (group B)

7.1 Memory Mounting Rules

This section explains the memory (DIMM) mounting conditions.

- Section 7.1.1, "Confirmation of DIMM Information" on page 7-3
- Section 7.1.2, "Memory Mounting Conditions" on page 7-4

The DIMMs on a motherboard unit are classified into group A and group B (see FIGURE 7-1).

Caution – To replace or install a DIMM, do not fail to confirm the DIMM information and comply with the conditions to mount the memory.

7.1.1 Confirmation of DIMM Information

Confirm the DIMM information (size/rank) in the following way.

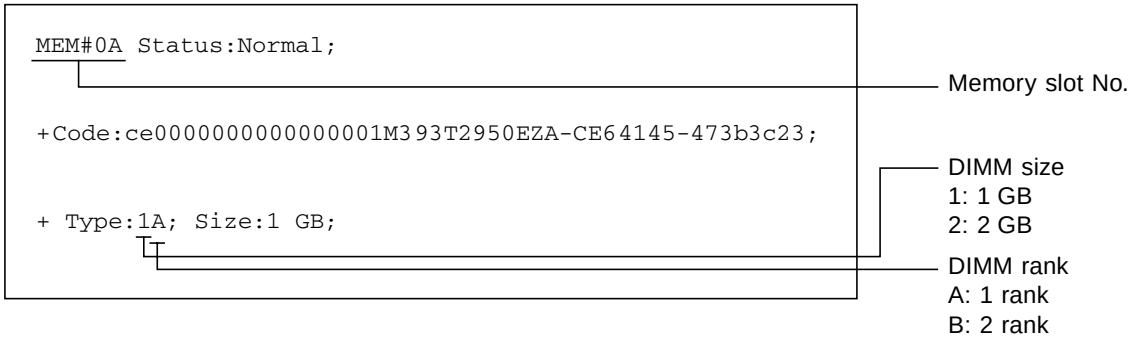
- Execute the `showhardconf`(8) command on XSCFU.

  The "Type" field shows the DIMM size and the DIMM rank.

```
XSCF> showhardconf
 ...
    MBU_A Status:Normal; Ver:0101h; Serial:PP0829045F  ;
        + FRU-Part-Number:CA07082-D902 A1   /541-3302-01          ;
        + CPU Status:Normal;
            + Freq:2.520 GHz; Type:32;
            + Core:4; Strand:2;
        + Memory_Size:8 GB;
        MEM#0A Status:Normal;
            + Code:ce0000000000000001M3 93T2950EZA-CE6 4145-473b3c23;
            + Type:1A; Size:1 GB;
        MEM#0B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b2918;
            + Type:1A; Size:1 GB;
        MEM#1A Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28af;
            + Type:1A; Size:1 GB;
        MEM#1B Status:Normal;
            + Code:7f7ffe00000000004aEBE10RD4AJFA-5C-E 3020-223b28ab;
            + Type:1A; Size:1 GB;
        ...
```

FIGURE 7-2 shows the explanation of DIMM information.

FIGURE 7-2 Explanation of DIMM Information



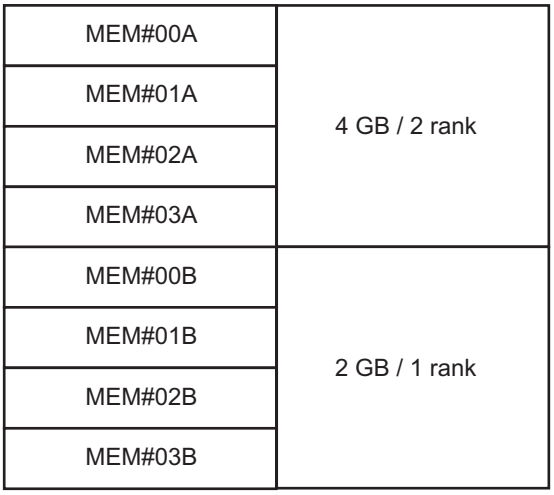
7.1.2 Memory Mounting Conditions

Memory mounting conditions are as follows:

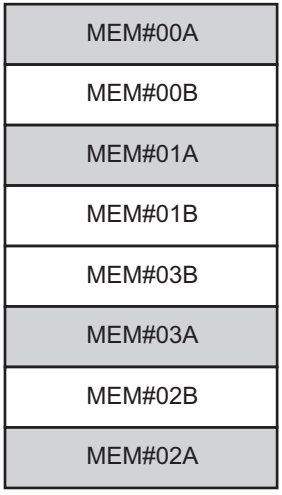
- A maximum of eight DIMMs can be mounted. They are mounted in units of four DIMMs in each of group A and group B.
- The DIMM capacity of group A must be equal to or greater than that of group B. The DIMM capacity of group A must not be smaller than that of group B.
- The DIMMs included in the same group must have the same capacity and same rank.

FIGURE 7-3 shows an example of DIMM mounting.

FIGURE 7-3 Example Mounting DIMM

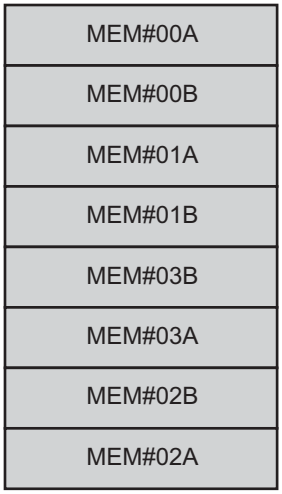


1. **Mount DIMMs in group A first.**



2. **Mount DIMMs in group B.**

DIMMs may not necessarily be mounted in group B.



7.2 Accessing the DIMMs

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

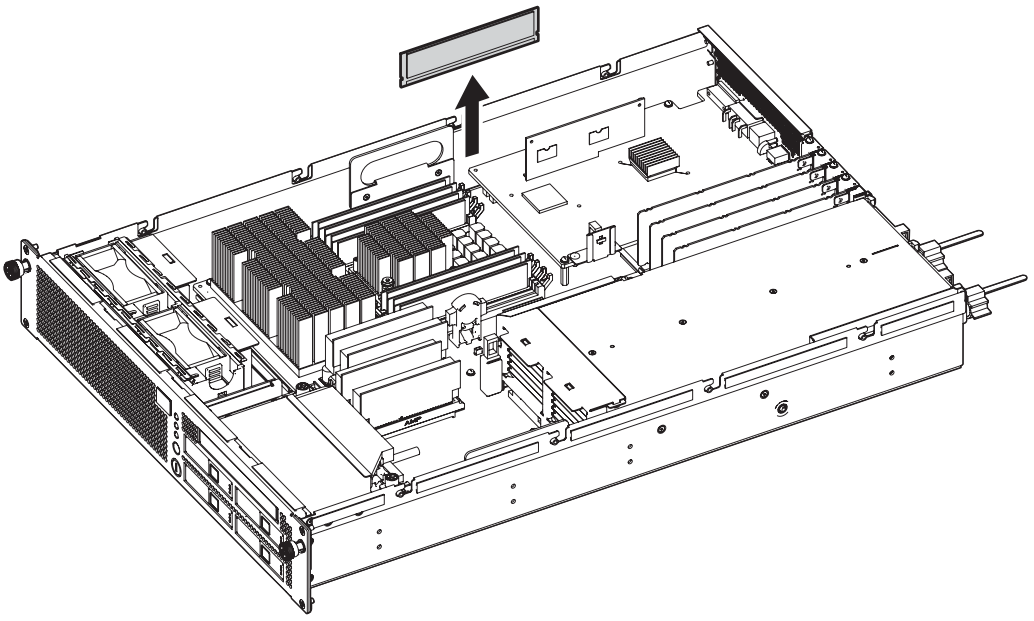
4. **Remove the air duct from the server.**

   For details, see Section 5.3.2, "Removing the Air Duct" on page 5-5.

7.3 Removing the DIMMs

1. **Pull the DIMM eject levers outward to release the DIMM.**
2. **Pull the DIMM upwards to remove the DIMM from the socket.**
3. **Place the DIMM on a conductive mat.**

FIGURE 7-4 Removing the DIMMs



7.4 Installing the DIMMs

1. **Push the DIMM evenly into the DIMM socket.**
2. **Push the DIMM eject levers inward to secure the DIMM in position.**

When mounting DIMMs, align the indentation with the corresponding connector part.

7.5 Reassembling the Server

1. **Attach the air duct.**

   For details, see Section 5.3.3, "Attaching the Air Duct" on page 5-6.

2. **Attach the top cover.**

   For details, see Section 5.2.2, "Attaching the Top Cover" on page 5-4.

3. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.

4. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, "Power-on by Using the XSCF Command" on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

---

5. **Check the hardware.**

   This procedure includes the steps for running a program to verify that all the components have been remounted and to start the Solaris OS.

   For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 8

Replacement and Installation of PCIe Cards

This chapter explains how to replace and install PCIe cards.

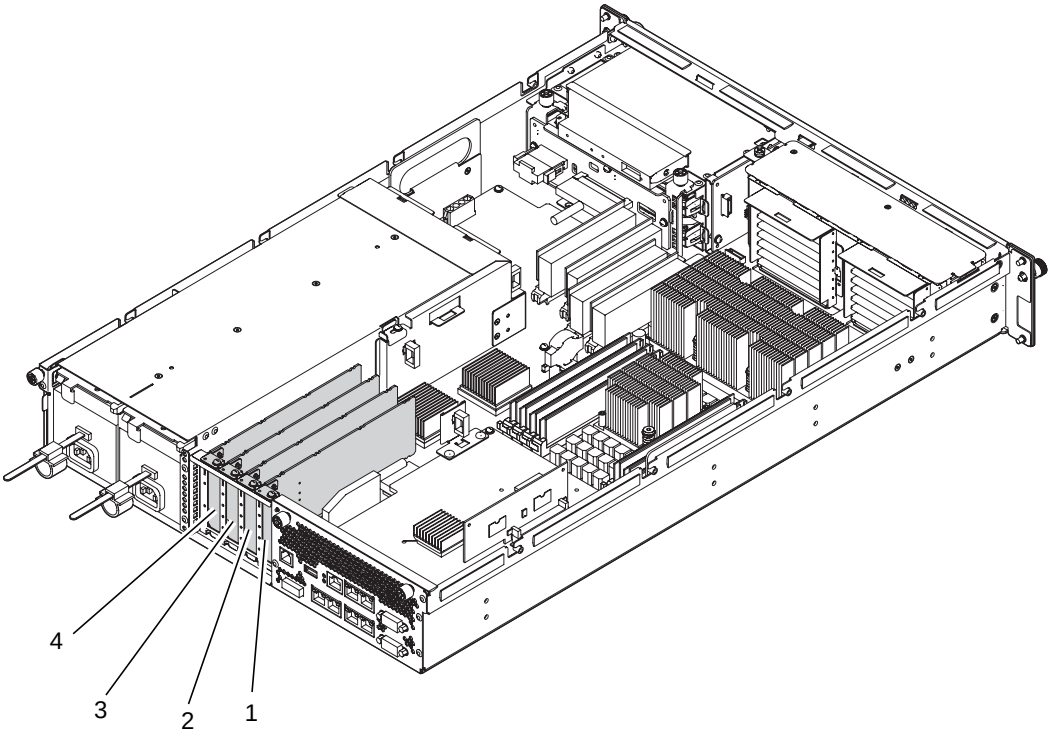
- Section 8.1, “Accessing a PCIe Card” on page 8-3
- Section 8.2, “Removing a PCIe Card” on page 8-4
- Section 8.3, “Mounting a PCIe Card” on page 8-4
- Section 8.4, “Reassembling the Server” on page 8-5

PCIe cards are hot replacement components.

The same methods as those for replacement are used for installation of PCIe cards.

FIGURE 8-1 shows the locations of the PCIe slots.

FIGURE 8-1 PCIe Slot Locations



Location number	Component
1	PCIe slot (PCIe#0)
2	PCIe slot (PCIe#1)
3	PCIe slot (PCIe#2)
4	PCIe slot (PCIe#3)

8.1 Accessing a PCIe Card

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

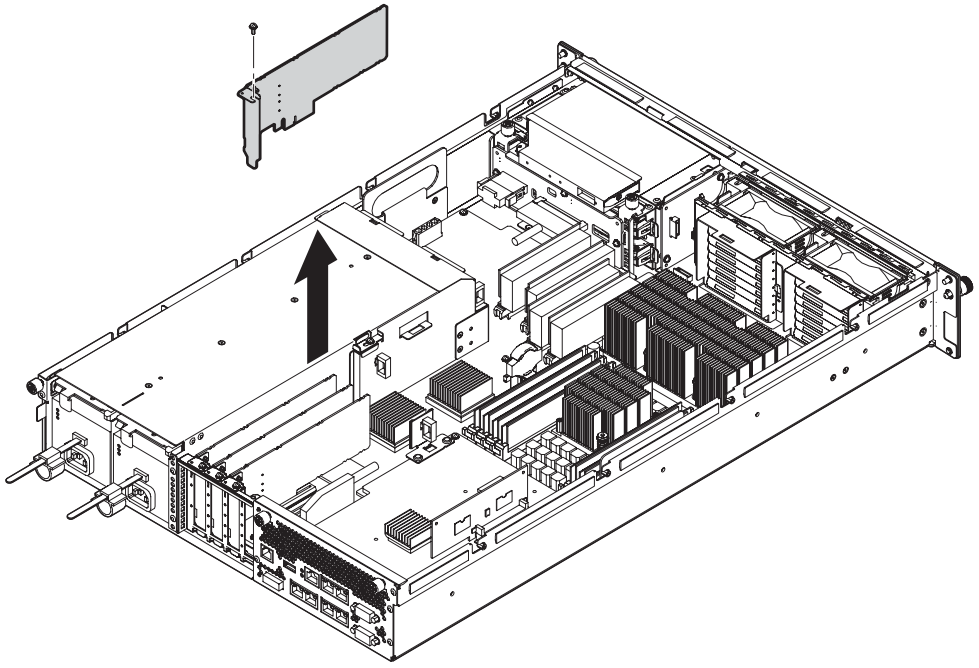
   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

8.2 Removing a PCIe Card

Note – If a new PCIe card is to be installed in an empty disk slot, remove the PCIe slot cover first.

1. **Remove the one screw securing the PCIe card.**
2. **Pull a PCIe card straight up from the slot, and then place it on a conductive mat.**

FIGURE 8-2 Removing a PCIe card



8.3 Mounting a PCIe Card

1. **Insert a PCIe card in a slot.**

Note – A card must be firmly secured so that it is properly mounted.

2. **Install and tighten the one screw to secure the PCIe card in position.**

8.4 Reassembling the Server

1. **Attach the top cover.**

   For details, see Section 5.2.2, "Attaching the Top Cover" on page 5-4.

2. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.

3. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, "Power-on by Using the XSCF Command" on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

4. **Check the hardware.**

   This procedure includes the steps for running a program to verify that all the components have been remounted and to start the Solaris OS.

   For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 9

Replacement and Installation of a Hard Disk Drive (HDD)

This chapter explains how to replace and install a hard disk drive.

- Section 9.1, "Accessing a Hard Disk Drive" on page 9-3
- Section 9.2, "Removing a Hard Disk Drive" on page 9-3
- Section 9.3, "Installing a Hard Disk Drive" on page 9-5
- Section 9.4, "Reassembling the Server" on page 9-5

Hard disk drives are active/hot replacement components.

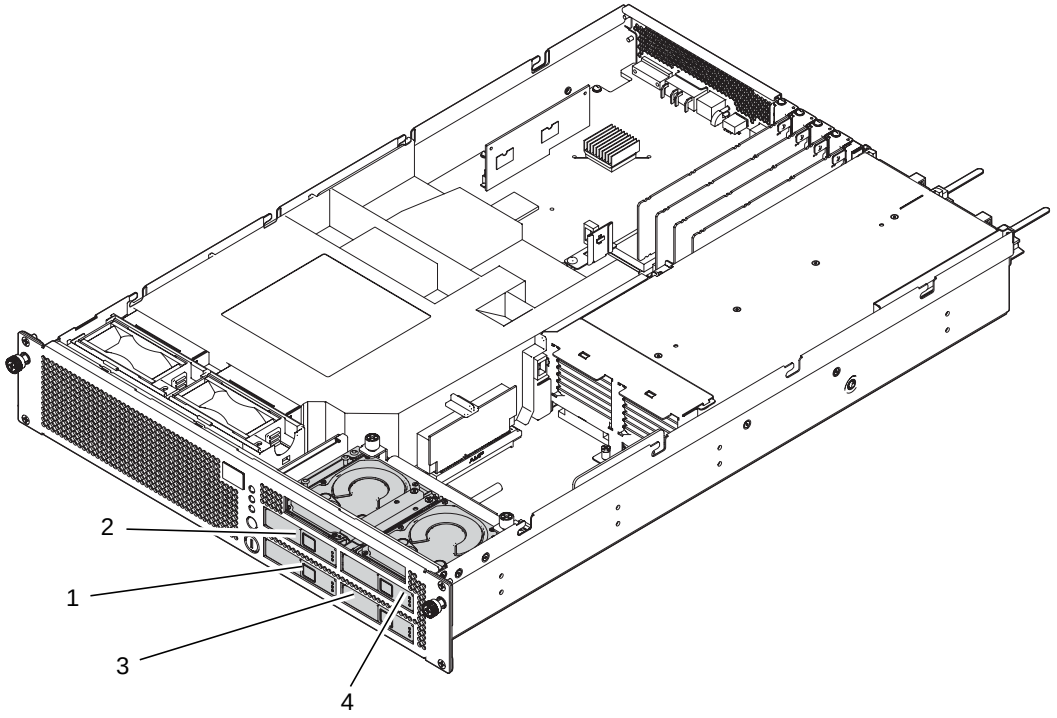
Note – Only when the disk mirroring software is used, a redundant configuration is created with the hard disk drive.

Note – If a hard disk drive is an unmirrored boot device, it must be replaced by using the cold replacement procedure. However, if a boot device can be disconnected by means of a Solaris OS function or disk mirroring software function, active replacement can also be performed. The procedure for disconnecting a hard disk drive varies depending on the software being used. For details, see the manuals for the relevant software.

The same methods as those for replacement are used for installation of a hard disk drive.

FIGURE 9-1 shows the locations of the hard disk drives.

FIGURE 9-1 Hard Disk Drive Location



Location number	Component
1	Hard disk drive (HDD#0)
2	Hard disk drive (HDD#1)
3	Hard disk drive (HDD#2)
4	Hard disk drive (HDD#3)

9.1 Accessing a Hard Disk Drive

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. Section 1.1, "ESD Precautions" on page 1-1.

- Release the hard disk drive from the domain.

  This procedure includes the steps of using the `cfgadm` command to check the Ap_Id, and for releasing the hard disk drive. For details, see Section 4.3.1, "Releasing a FRU from a Domain" on page 4-5.

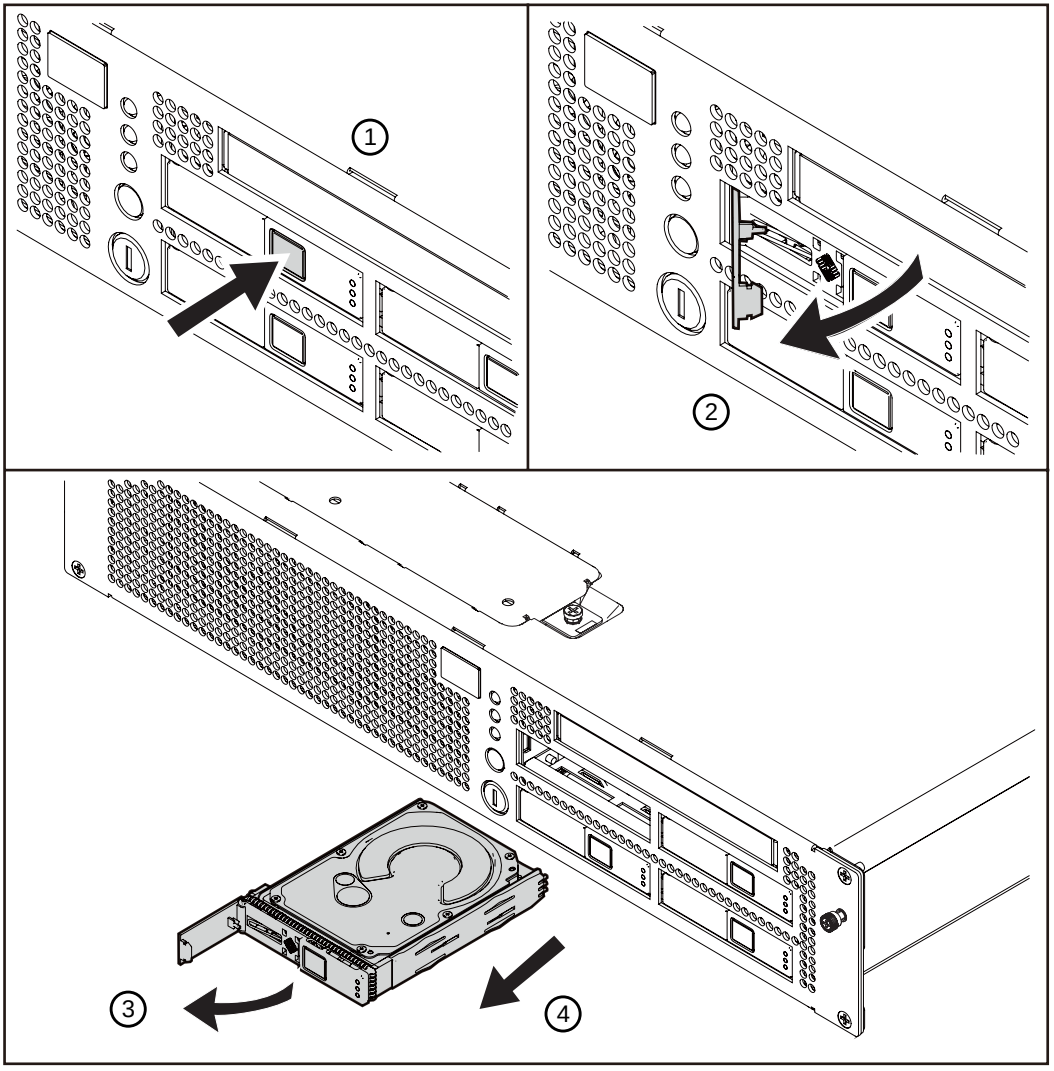
9.2 Removing a Hard Disk Drive

Note – If a new hard disk drive is to be installed in an empty disk slot, remove the HDD filler panel first.

1. **Push the square button on the front of the hard disk drive (1 in FIGURE 9-2) to release the eject/lock lever (2 in FIGURE 9-2).**
2. **Pull the eject/lock lever (3 in FIGURE 9-2) so that the hard disk drive is pulled straight out from the unit (4 in FIGURE 9-2).**

3. **Remove the hard disk drive and place it on a conductive mat.**

FIGURE 9-2 Removing a Hard Disk Drive



9.3 Installing a Hard Disk Drive

Caution – If a hard disk drive cannot be inserted smoothly, do not forcibly push the hard disk drive into the slot. If the HDD is forcibly inserted despite the presence of any obstruction in a slot or any problems with the connector pin, serious damage may result.

Caution – Do not insert a hard disk drive into a slot when the eject/lock lever is closed. If an HDD is inserted in this condition, it stops halfway and becomes difficult to pull out.

1. **Align the hard disk drive with the slot, and then push the hard disk drive in until it stops.**
2. **Fasten the eject/lock lever.**

9.4 Reassembling the Server

1. **Configure the hard disk drive in the domain.**

   This procedure includes the steps of using the `cfgadm` command to connect the hard disk drive to the domain, and for verifying that it has been added to the domain. For details, see Section 4.3.3, “Configuring a FRU in a Domain” on page 4-6.

2. **Check the hardware.**

   This procedure includes the steps of running a program to verify that all the components have been remounted and to start the Solaris OS.

   For details, see Section 4.5.4, “Verifying the Hardware Operation” on page 4-15.

3. **Verify the state of the LED indicator of the hard disk drive.**

   For information on the LED status, see TABLE 2-3 to TABLE 2-5.

CHAPTER 10

Replacing the Hard Disk Drive Backplane

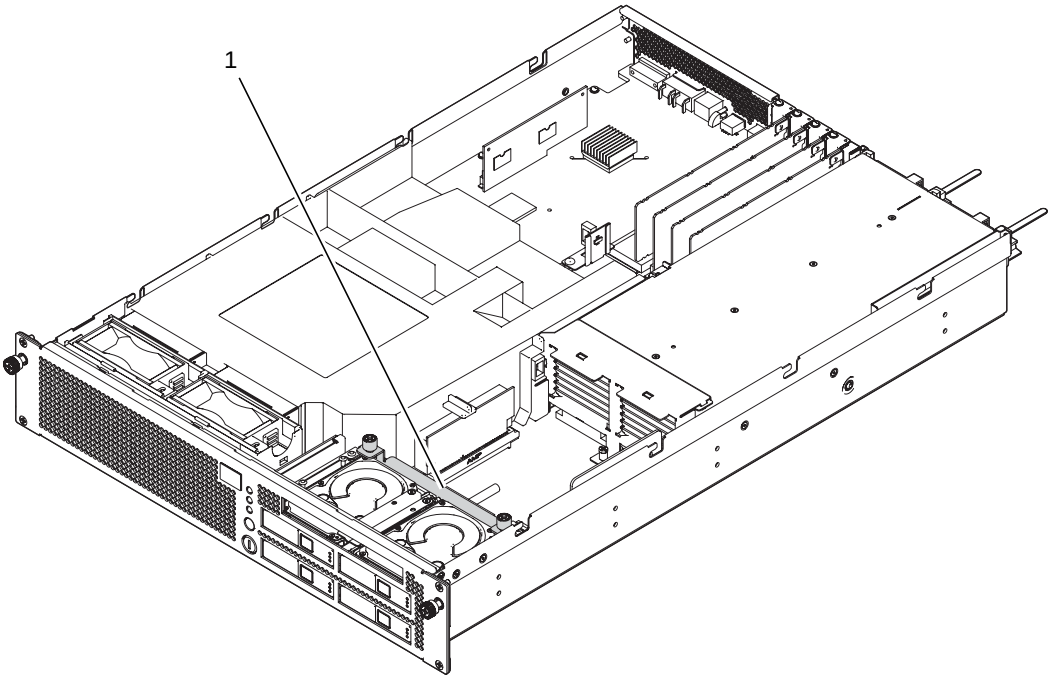
This chapter explains how to replace the hard disk drive backplane.

- Section 10.1, "Accessing the Hard Disk Drive Backplane" on page 10-2
- Section 10.2, "Removing the Hard Disk Drive Backplane" on page 10-3
- Section 10.3, "Mounting the Hard Disk Drive Backplane" on page 10-5
- Section 10.4, "Reassembling the Server" on page 10-6

The hard disk drive backplane is a cold replacement component. The entire server must be powered off and the power cords must be disconnected to replace the hard disk drive backplane.

FIGURE 10-1 shows the location of the hard disk drive backplane.

FIGURE 10-1 Hard Disk Drive Backplane Location



Location number	Component
1	Hard disk drive backplane (HDDBP#0)

10.1 Accessing the Hard Disk Drive Backplane

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Note – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

4. **Remove the air duct from the server.**

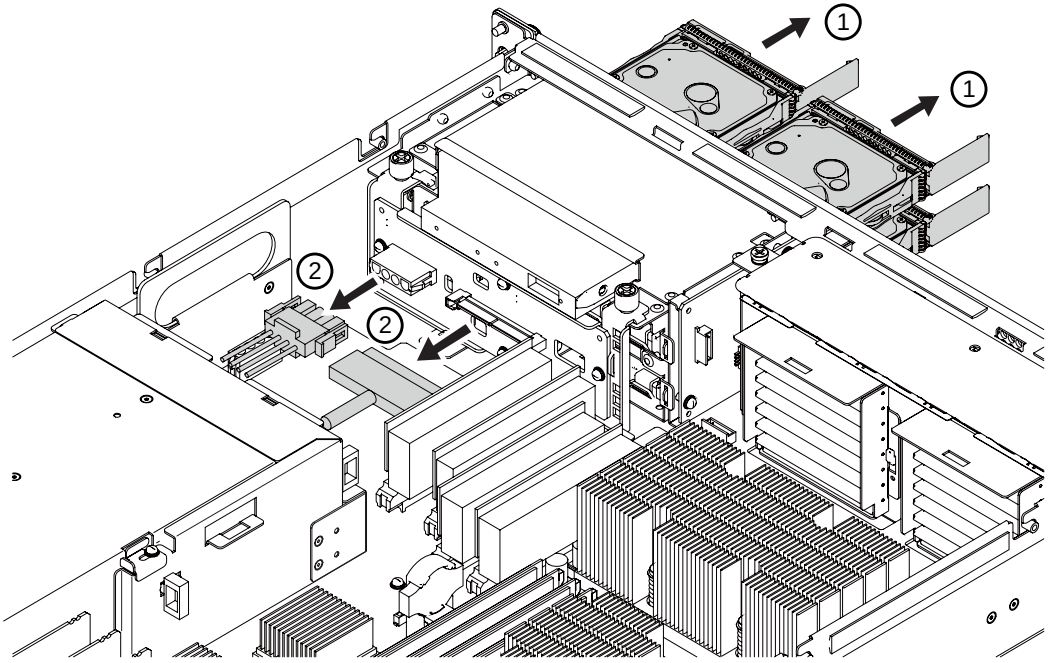
   For details, see Section 5.3.2, "Removing the Air Duct" on page 5-5."

10.2 Removing the Hard Disk Drive Backplane

1. **Pull out all the hard disk drives (including HDD filler panels) from the server by several centimeters (1 in** FIGURE 10-2**).**

2. **Remove the two cables from the rear of the hard disk drive backplane (2 in FIGURE 10-2).**

FIGURE 10-2 Removing the Cables of the Hard Disk Drive Backplane



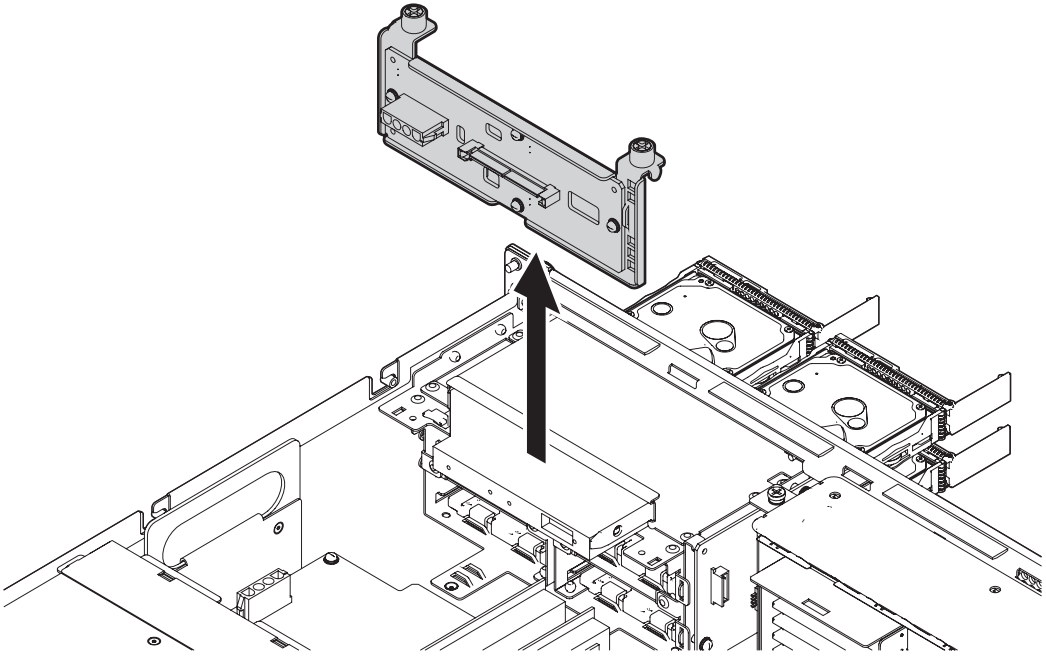
3. **Remove the cables connected to the CD-RW/DVD-RW drive unit.**

4. **Pull the CD-RW/DVD-RW drive unit out by several centimeters.**

   For details, see Section 11.2, "Removing the CD-RW/DVD-RW Drive Unit" on page 11-3.

5. **Loosen the two screws to remove the hard disk drive backplane.**

FIGURE 10-3 Removing the Hard Disk Drive Backplane



6. **Place the hard disk drive backplane on a conductive mat.**

10.3 Mounting the Hard Disk Drive Backplane

1. **Mount the hard disk drive backplane.**
2. **Tighten the two screws to secure the hard disk drive backplane.**
3. **Secure the two cables to the rear of the hard disk drive backplane.**

Caution – Do not forcibly mount the hard disk drive in a slot. Forcibly pushing the component in a slot may damage the component or the server.

4. **Mount the hard disk drives.**

   For details, see Section 9.3, "Installing a Hard Disk Drive" on page 9-5.

5. **Mount the CD-RW/DVD-RW drive unit.**

   For details, see Section 11.3, "Mounting the CD-RW/DVD-RW Drive Unit" on page 11-4.

10.4 Reassembling the Server

1. **Attach the air duct.**

   For details, see Section 5.3.3, "Attaching the Air Duct" on page 5-6.

2. **Attach the top cover.**

   For details, see Section 5.2.2, "Attaching the Top Cover" on page 5-4.

3. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.

4. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, "Power-on by Using the XSCF Command" on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

---

5. **Check the hardware.**

   This procedure includes the steps of running a program to verify that all the components have been remounted and to start the Solaris OS.

   For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 11

CD-RW/DVD-RW Drive Unit (DVDU) Replacement

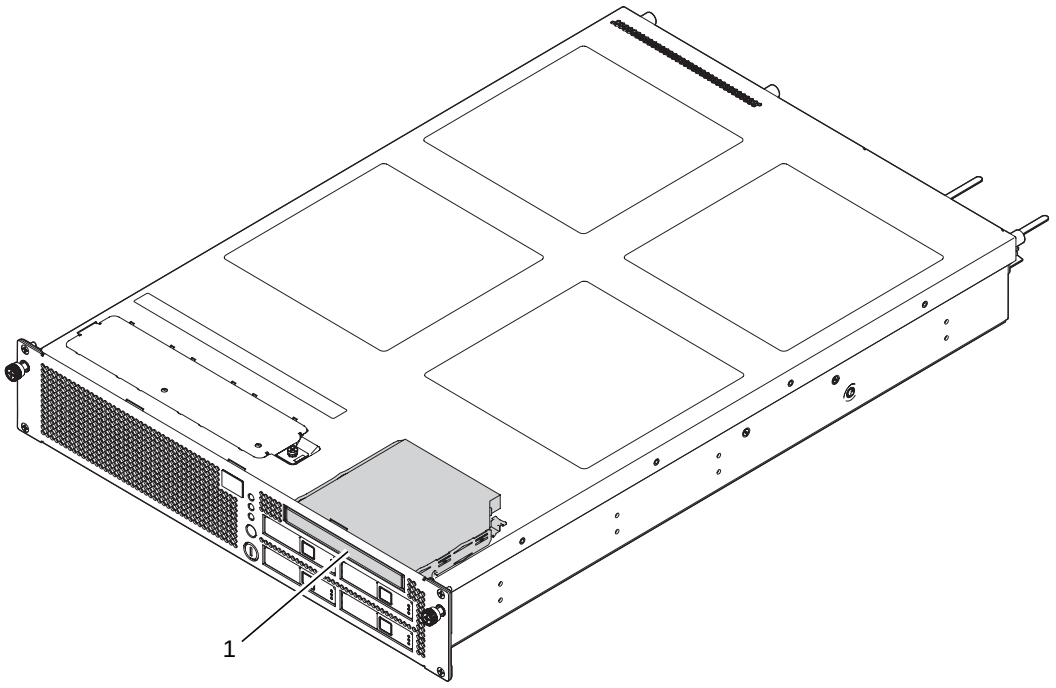
This chapter explains how to replace the CD-RW/DVD-RW driver unit.

- Section 11.1, "Accessing the CD-RW/DVD-RW Drive Unit" on page 11-2
- Section 11.2, "Removing the CD-RW/DVD-RW Drive Unit" on page 11-3
- Section 11.3, "Mounting the CD-RW/DVD-RW Drive Unit" on page 11-4
- Section 11.4, "Reassembling the Server" on page 11-5

CD-RW/DVD-RW drive unit is a cold replacement component. The entire server must be powered off and the power cords must be disconnected to replace the CD-RW/DVD-RW drive unit.

FIGURE 11-1 shows the location of the CD-RW/DVD-RW drive unit.

FIGURE 11-1 Location of the CD-RW/DVD-RW Drive Unit



Location number	Component
1	CD-RW/DVD-RW drive unit (DVDU)

11.1 Accessing the CD-RW/DVD-RW Drive Unit

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

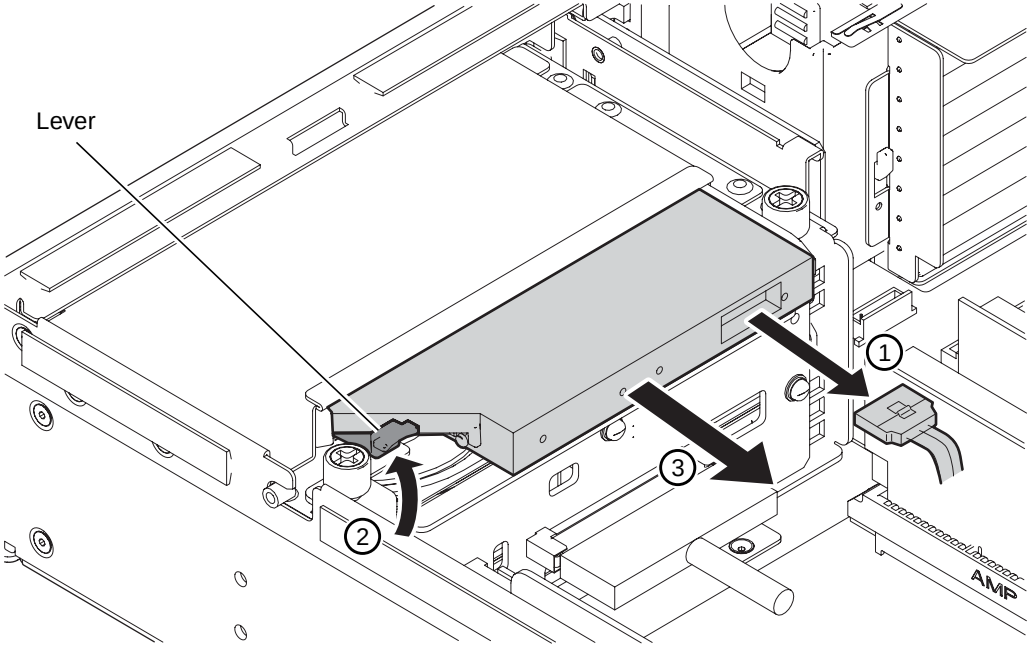
11.2 Removing the CD-RW/DVD-RW Drive Unit

1. **Remove the cables connected to the CD-RW/DVD-RW drive unit (1 in FIGURE 11-2).**

   At this time, disconnect the cable while pressing the tab on the cable.

2. **While pushing the black lever upward (2 in FIGURE 11-2), push the CD-RW/DVD-RW drive unit toward the front side to remove it from the server (3 in FIGURE 11-2).**

FIGURE 11-2 Removing the CD-RW/DVD-RW Drive Unit



3. **Place the drive unit on the conductive mat.**

11.3 Mounting the CD-RW/DVD-RW Drive Unit

Caution – Do not forcibly push the CD-RW/DVD-RW drive unit to insert in the slot. Forcibly pushing the component in a slot may damage the component or the server.

1. **Align the CD-RW/DVD-RW drive unit with the drive slot, and then slowly push the unit in until it locks in position.**

2. **Connect the cable for the CD-RW/DVD-RW drive unit.**

11.4 Reassembling the Server

1. **Attach the top cover.**

   For details, see Section 5.2.2, "Attaching the Top Cover" on page 5-4.

2. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.

3. **Power on the server.**

   This procedure includes the steps of reconnecting the power cords and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, "Power-on by Using the XSCF Command" on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

---

4. **Check the hardware.**

   This procedure includes the steps for running a program to verify that all the components have been remounted and to start the Solaris OS.

   For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 12

Power Supply Unit Replacement

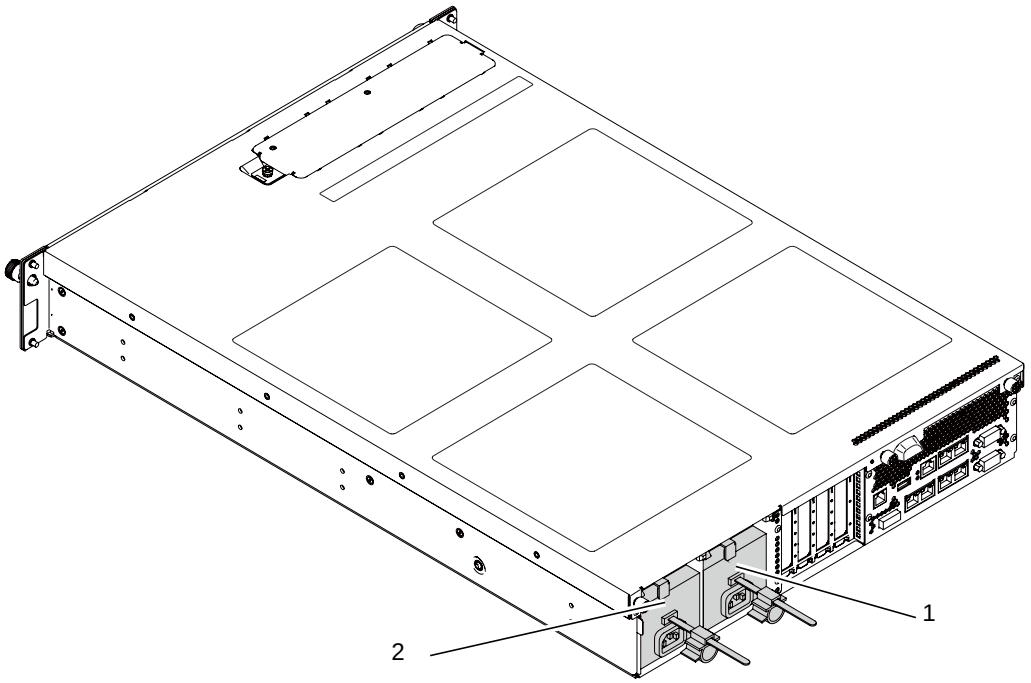
This chapter explains how to replace a power supply unit.

- Section 12.1, “Accessing a Power Supply Unit” on page 12-3
- Section 12.2, “Removing the Power Supply Unit” on page 12-3
- Section 12.3, “Mounting the Power Supply Unit” on page 12-5
- Section 12.4, “Reassembling the Server” on page 12-5

The power supply unit is an active/hot replacement component. To guarantee the redundant configuration, only one power supply unit must be replaced at a time.

FIGURE 12-1 shows the locations of power supply units.

FIGURE 12-1 Locations of Power Supply Units



Location number	Component
1	Power supply unit (PSU#0)
2	Power supply unit (PSU#1)

12.1 Accessing a Power Supply Unit

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **From the XSCF Shell prompt, use the `replacefru` command to disable the power supply unit to be removed.**

```
XSCF> replacefru
```

   The `replacefru` command is a menu-driven interactive command. The `replacefru` continues operating while the power supply unit is removed. Afterwards, it performs the power supply unit test. For details, see Section 4.4.1, "FRU Removal and Replacement" on page 4-8.

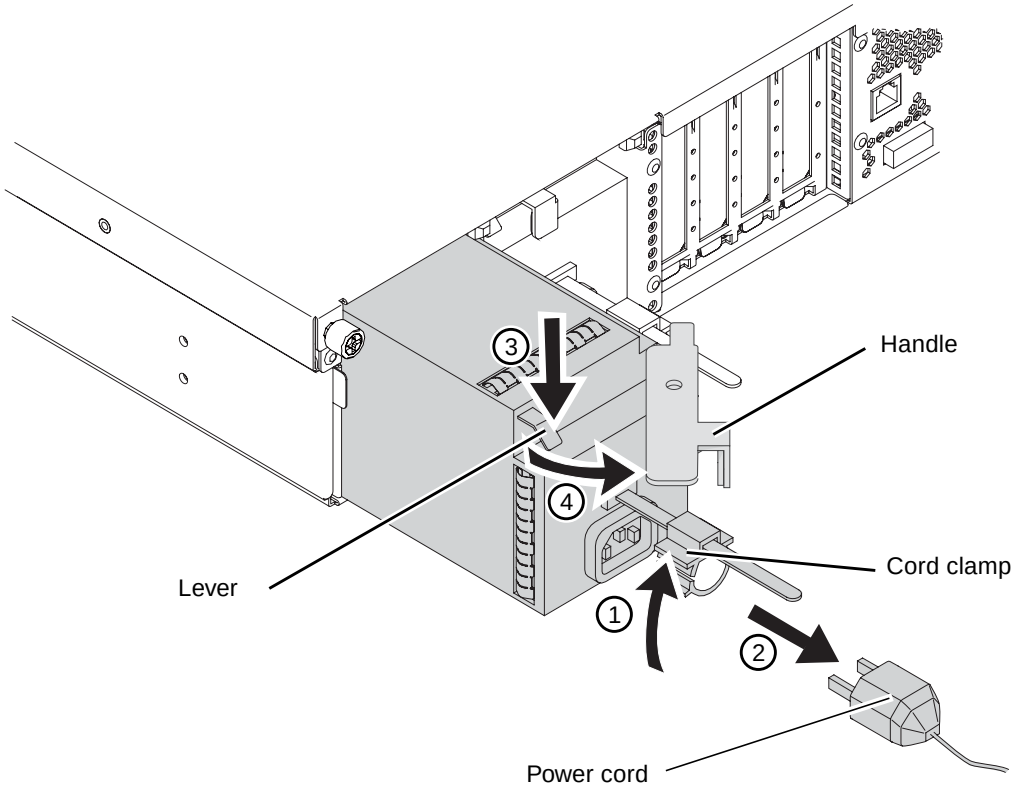
2. **Loosen the thumbscrew of the cable management arm that is located on the right side when you are facing the rear of the server.**
3. **Pull out the cable management arm while keeping it from coming into contact with the power supply unit.**

12.2 Removing the Power Supply Unit

1. **Verify that the CHECK LED of the power supply unit is blinking and the DC LED is off.**
2. **Release the lock of the cord clamp (1 in FIGURE 12-2).**
3. **Remove the power cord from the power supply unit (2 in FIGURE 12-2).**

4. **While pressing the lever (3 in FIGURE 12-2), pull the handle outward (4 in FIGURE 12-2).**

FIGURE 12-2 Removing the Power Supply Unit



5. **With one hand supporting the bottom of the power supply, remove the power supply unit.**

6. **Place the power supply unit on a conductive mat.**

12.3 Mounting the Power Supply Unit

Caution – Do not forcibly push the power supply unit into the slot. Forcibly pushing the component in a slot may damage the component or the server.

1. **Align the top of the unit with the top of the slot.**

   Doing so prevents the bottom of the slot from cutting the power cord at the bottom of the unit.

2. **Set the handle so that it is perpendicular to the server, and then push the power supply unit into the slot.**

3. **Insert the power supply unit until it reaches the predetermined position, and then return the handle to its original position.**

4. **Secure the power cord with the cord clamp.**

12.4 Reassembling the Server

- From the XSCF Shell prompt, use the `showhardconf` command to verify that the new power supply unit has been installed.

```
XSCF> showhardconf
```

For details, see Section 4.4.2, "Verifying the Hardware Operation" on page 4-10.

CHAPTER 13

Fan Unit Replacement

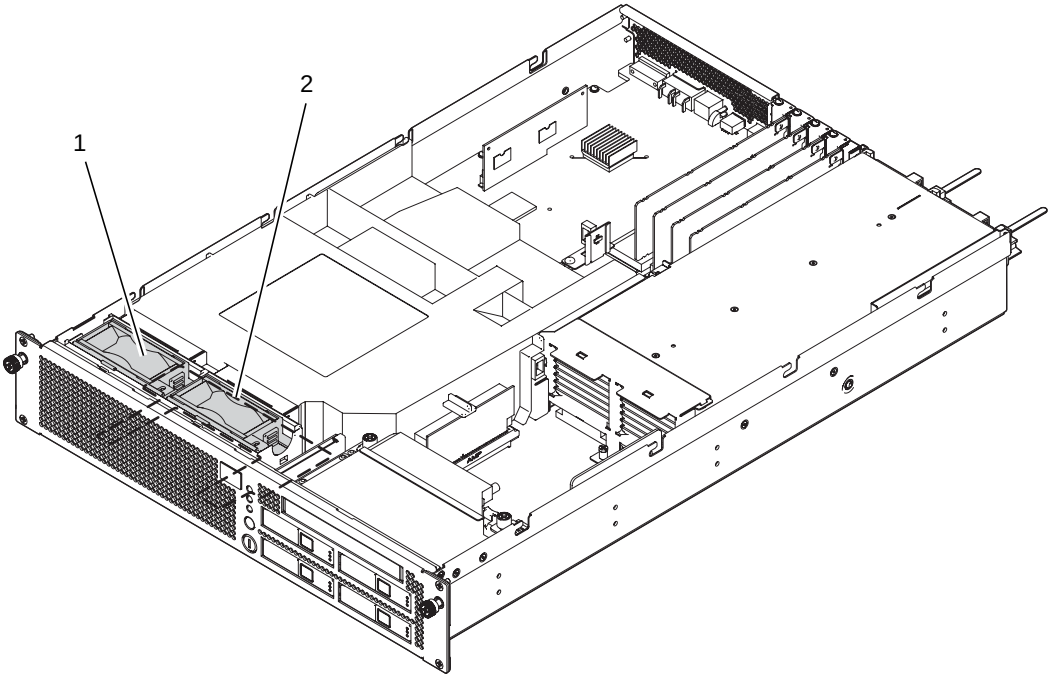
This chapter explains how to replace a fan unit.

- Section 13.1, “Accessing a Fan Unit” on page 13-3
- Section 13.2, “Removing a Fan Unit” on page 13-3
- Section 13.3, “Mounting a Fan Unit” on page 13-5
- Section 13.4, “Reassembling the Server” on page 13-5

A fan unit is an active/hot replacement component. To guarantee the redundant configuration, only one fan unit must be replaced at a time.

FIGURE 13-1 indicates the location of the fan unit.

FIGURE 13-1 Fan Unit Locations



Location number	Component
1	Fan unit (FAN_A#0)
2	Fan unit (FAN_A#1)

13.1 Accessing a Fan Unit

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **From the XSCF Shell prompt, use the `replacefru` command to disable the fan unit to be removed.**

```
XSCF> replacefru
```

The `replacefru` command is a menu-driven interactive command. The `replacefru` continues operating while the fan unit is removed. Then later, it performs the fan unit test. For details, see Section 4.4.1, "FRU Removal and Replacement" on page 4-8.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

3. **Remove the fan cover.**

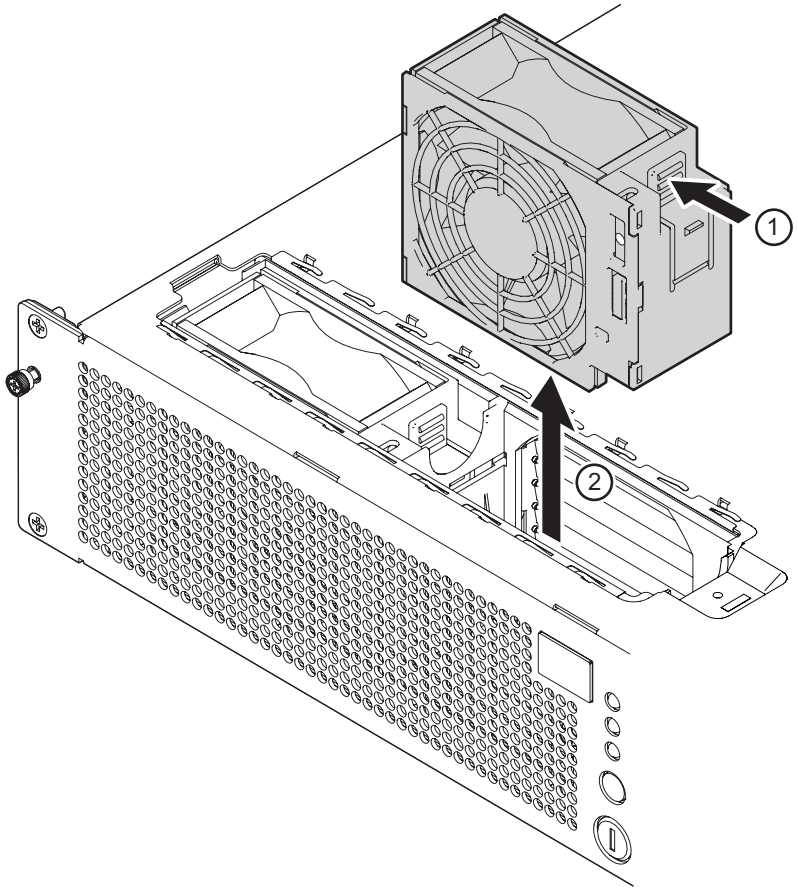
   For details, see Section 5.4.1, "Removing the Fan Cover" on page 5-7.

13.2 Removing a Fan Unit

1. **While pressing the latch (1 in FIGURE 13-2), lift the fan unit (2 in FIGURE 13-2).**

2. **Remove the fan unit from the server, and place it on a conductive mat.**

FIGURE 13-2 Removing a Fan Unit



13.3 Mounting a Fan Unit

Caution – Do not forcibly mount a fan unit in a slot. Forcibly pushing a fan unit in a slot may damage the fan unit or the server.

1. **Adjust the position of the fan unit so that its latch is on the right when you are facing the front of the server.**
2. **Insert the fan unit in the slot.**

13.4 Reassembling the Server

1. **Attach the fan cover.**

   For details, see Section 5.4.2, "Attaching the Fan Cover" on page 5-8.

2. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, "Sliding the Server into the Equipment Rack" on page 5-3.

3. **From the XSCF Shell prompt, use the `showhardconf` command to verify that the new fan unit has been installed.**

```
XSCF> showhardconf
```

   For details, see Section 4.4.2, "Verifying the Hardware Operation" on page 4-10.

CHAPTER 14

Fan Backplane Replacement

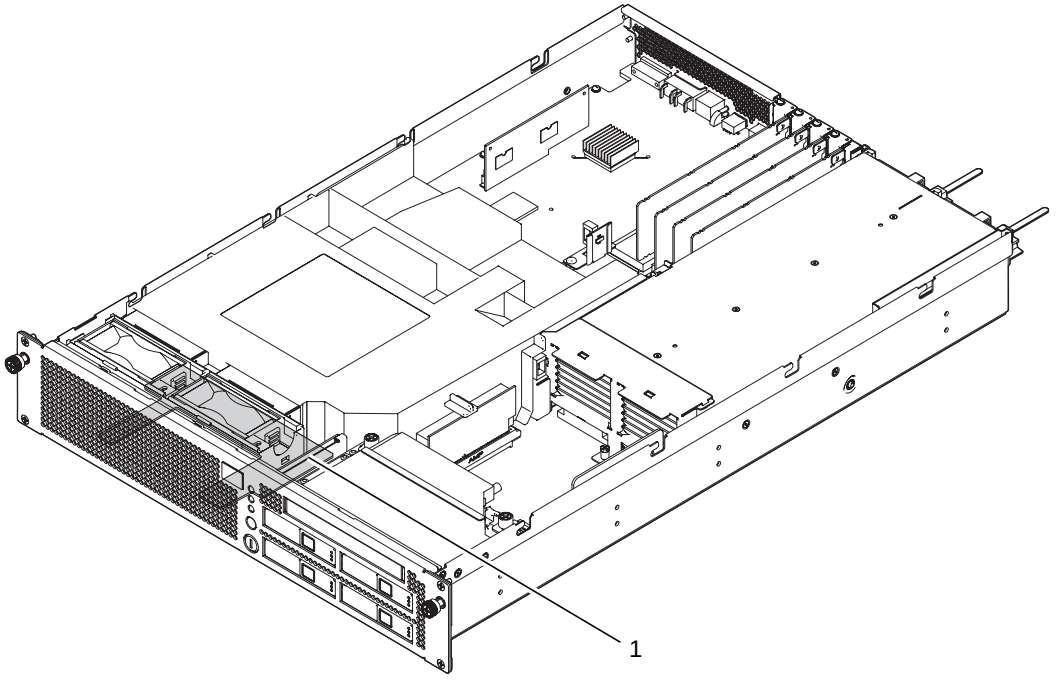
This chapter explains how to replace the fan backplane.

- Section 14.1, “Accessing the Fan Backplane” on page 14-2
- Section 14.2, “Removing the Fan Backplane” on page 14-5
- Section 14.3, “Mounting the Fan Backplane” on page 14-6
- Section 14.4, “Reassembling the Server” on page 14-6

The fan backplane is a cold replacement component. The entire server must be powered off and the power cords must be disconnected to replace the fan backplane.

FIGURE 14-1 shows the location of the fan backplane.

FIGURE 14-1 Fan Backplane Location



Location number	Component
1	Fan backplane (FANBP_B)

14.1 Accessing the Fan Backplane

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

4. **Remove the air duct from the server.**

   For details, see Section 5.3.2, "Removing the Air Duct" on page 5-5.

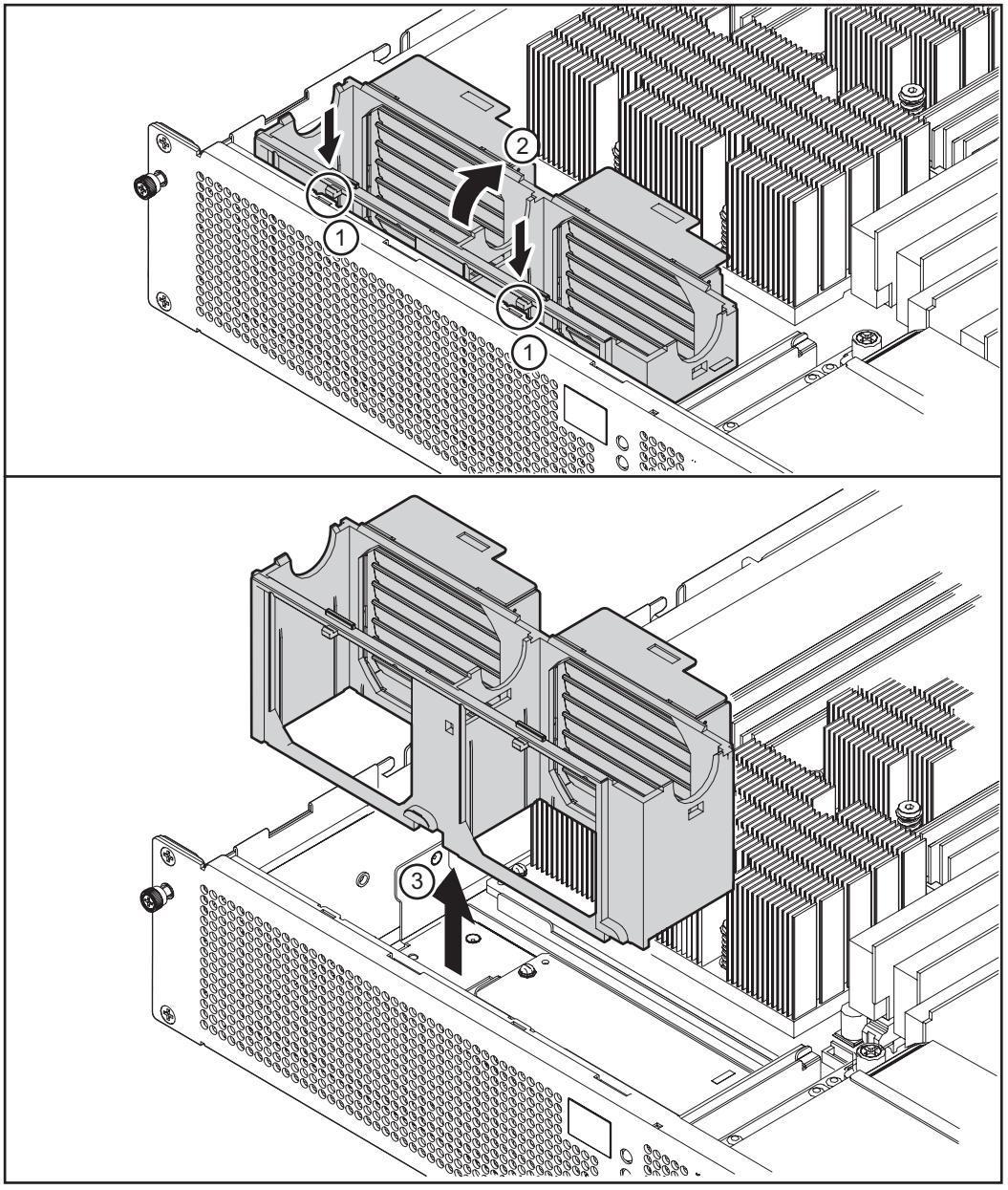
5. **Removing the fan units.**

   For details, see Section 13.2, "Removing a Fan Unit" on page 13-3.

6. **Press on the projections to remove the two tabs (1 in FIGURE 14-2), and incline the unit diagonally backward (2 in FIGURE 14-2).**

7. **Pull the fan cage upward to remove it (3 in FIGURE 14-2).**

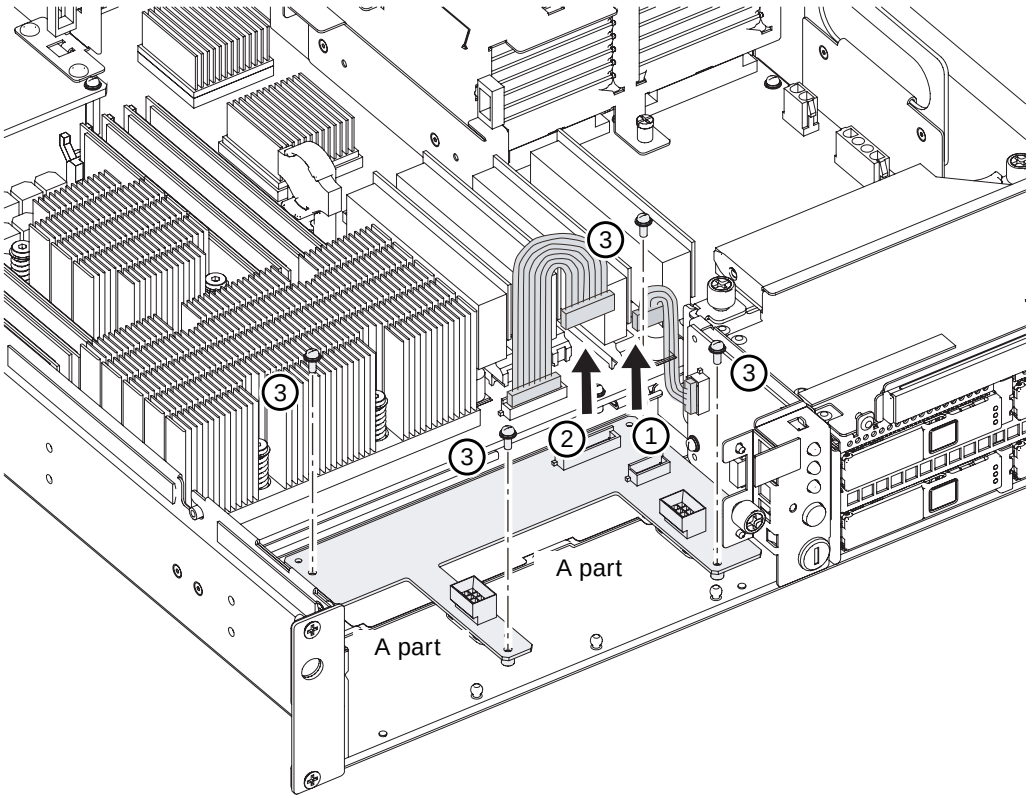
FIGURE 14-2 Removing the Fan Cage



14.2 Removing the Fan Backplane

1. **Remove the signal cable for the operator panel (1 in** FIGURE 14-3**).**
   The cable is on the right side of the fan backplane.
2. **Remove the signal cable connector for the motherboard unit (2 in** FIGURE 14-3**).**
   The cable connector is on the rear side of the fan backplane.
3. **Remove the four screws securing the fan backplane (3 in** FIGURE 14-3**).**

FIGURE 14-3 Removing the Fan Backplane



4. **Remove the fan backplane from the server, and place it on a conductive mat.**

14.3 Mounting the Fan Backplane

1. **Place the fan backplane on the bottom of the chassis.**

   Adjust the fan backplane so that it is level and it does not catch on any cables.

2. **Tighten the four screws to secure the fan backplane in position.**

3. **Connect the signal cable for the operator panel.**

   The cable is on the right side of the fan backplane.

4. **Mount the signal cable connector for the motherboard unit.**

   The cable connector is to be mounted on the rear side of the fan backplane.

14.4 Reassembling the Server

1. **Mount the fan cage.**

   Set the button of the fan cage at the A part in FIGURE 14-3, and insert the fan cage projections in the tabs (1 in FIGURE 14-1).

2. **Mount the fan units.**

   For details, see Section 13.3, “Mounting a Fan Unit” on page 13-5.

3. **Attach the air duct to the server.**

   For details, see Section 5.3.3, “Attaching the Air Duct” on page 5-6.

4. **Attach the top cover.**

   For details, see Section 5.2.2, “Attaching the Top Cover” on page 5-4.

5. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, “Sliding the Server into the Equipment Rack” on page 5-3.

6. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, “Power-on by Using the XSCF Command” on page 4-13.

Note – If automatic startup of the Solaris OS is specified, use the `sendbreak -d domain_id` command of the XSCF Shell to display the ok prompt after the display console banner is displayed but before the system starts booting the Solaris OS.

7. **Check the hardware.**

   This procedure includes the steps of running a program to verify that all the components have been remounted and starting the Solaris OS.

   For details, see Section 4.5.4, "Verifying the Hardware Operation" on page 4-15.

CHAPTER 15

Operator Panel Replacement

This chapter explains how to replace the operator panel.

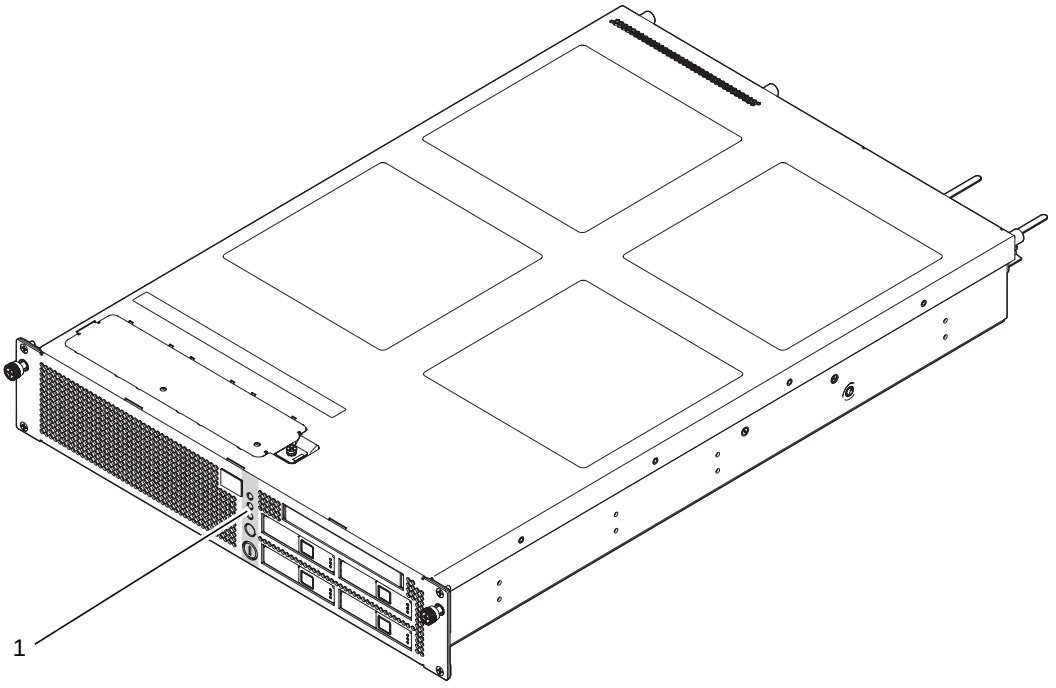
- Section 15.1, “Accessing the Operator Panel” on page 15-3
- Section 15.2, “Removing the Operator Panel” on page 15-4
- Section 15.3, “Mounting the Operator Panel” on page 15-5
- Section 15.4, “Reassembling the Server” on page 15-5

The operator panel is a cold replacement component. The entire server must be powered off and the power cords must be disconnected to replace the operator panel.

Caution – If the motherboard unit and operator panel are replaced at the same time, the server may fail to operate correctly. Before starting the replacement of the next FRU, execute the `showhardconf` or `showstatus` command to verify that the component replaced earlier is operating correctly.

FIGURE 15-1 shows the location of the operator panel.

FIGURE 15-1 Operator Panel Location



Location number	Component
1	Operator panel (OPNL)

15.1 Accessing the Operator Panel

Caution – There is a risk of electrical failure if the power cords are not disconnected. All the power cords must be disconnected to completely cut the power to the server.

Caution – To ensure that you and bystanders are not exposed to harm and to prevent damage to the system, observe the ESD safety precautions. See Section 1.1, "ESD Precautions" on page 1-1.

1. **Power off the server.**

   This procedure includes the steps of turning the mode switch on the operator panel to the Service position, verifying that the POWER LED is off, and disconnecting the power cord. For details, see Section 4.5.1, "Powering off the Server" on page 4-12.

2. **Slide the server out from the equipment rack.**

   For details, see Section 5.1.1, "Sliding the Server Out from the Equipment Rack" on page 5-1.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When the cable management arm is not mounted, remove the cable ties that fix the PCI cable to the rear of the server, and slide the server out.

3. **Remove the top cover.**

   For details, see Section 5.2.1, "Removing the Top Cover" on page 5-3.

4. **Remove the air duct from the server.**

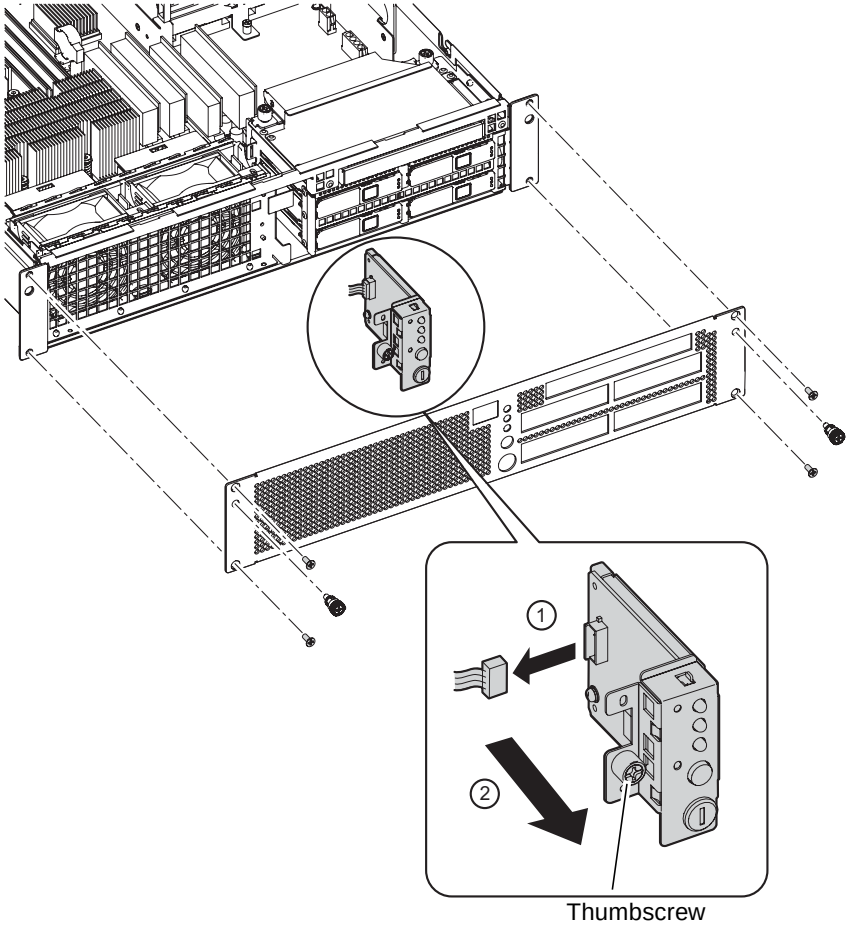
   For details, see Section 5.3.2, "Removing the Air Duct" on page 5-5.

5. **Remove the four screws on the front panel, and then remove the front panel.**

15.2 Removing the Operator Panel

1. **Disconnect the signal cable from the operator pane (1 in FIGURE 15-2).**
2. **Loosen the one thumbscrew.**
3. **Pull the operator panel out to remove it, and place it on a conductive mat (2 in FIGURE 15-2).**

FIGURE 15-2 Removing the Operator Panel



15.3 Mounting the Operator Panel

1. **Align the keyhole of the operator panel with the thumbscrew, and gently push the operator panel toward the server.**

   If the operator panel will not move, gently adjust the position of the operator panel so that the light pipe on the front of the operator panel is aligned with the socket on the server front.

2. **Connect the signal cable of the operator panel.**

3. **Attach the thumbscrew.**

4. **Tighten the four screws to install the front panel.**

15.4 Reassembling the Server

1. **Attach the air duct.**

   For details, see Section 5.3.3, “Attaching the Air Duct” on page 5-6.

2. **Attach the top cover.**

   For details, see Section 5.2.2, “Attaching the Top Cover” on page 5-4.

3. **If the equipment rack is supplied with a Quake-Resistant Options Kit or stabilizer, return to its original position.**

   For details, see Section 5.1.2, “Sliding the Server into the Equipment Rack” on page 5-3.

4. **Power on the server.**

   This procedure includes the steps of reconnecting the power cord, checking the LED status, and turning the mode switch on the operator panel to the Locked position. For details, see Section 4.5.3.1, “Power-on by Using the XSCF Command” on page 4-13.

5. **Check the hardware.**

   This procedure includes the steps of running a program to verify that all the components have been remounted and starting the Solaris OS.

   For details, see Section 4.5.4, “Verifying the Hardware Operation” on page 4-15.

APPENDIX **A**

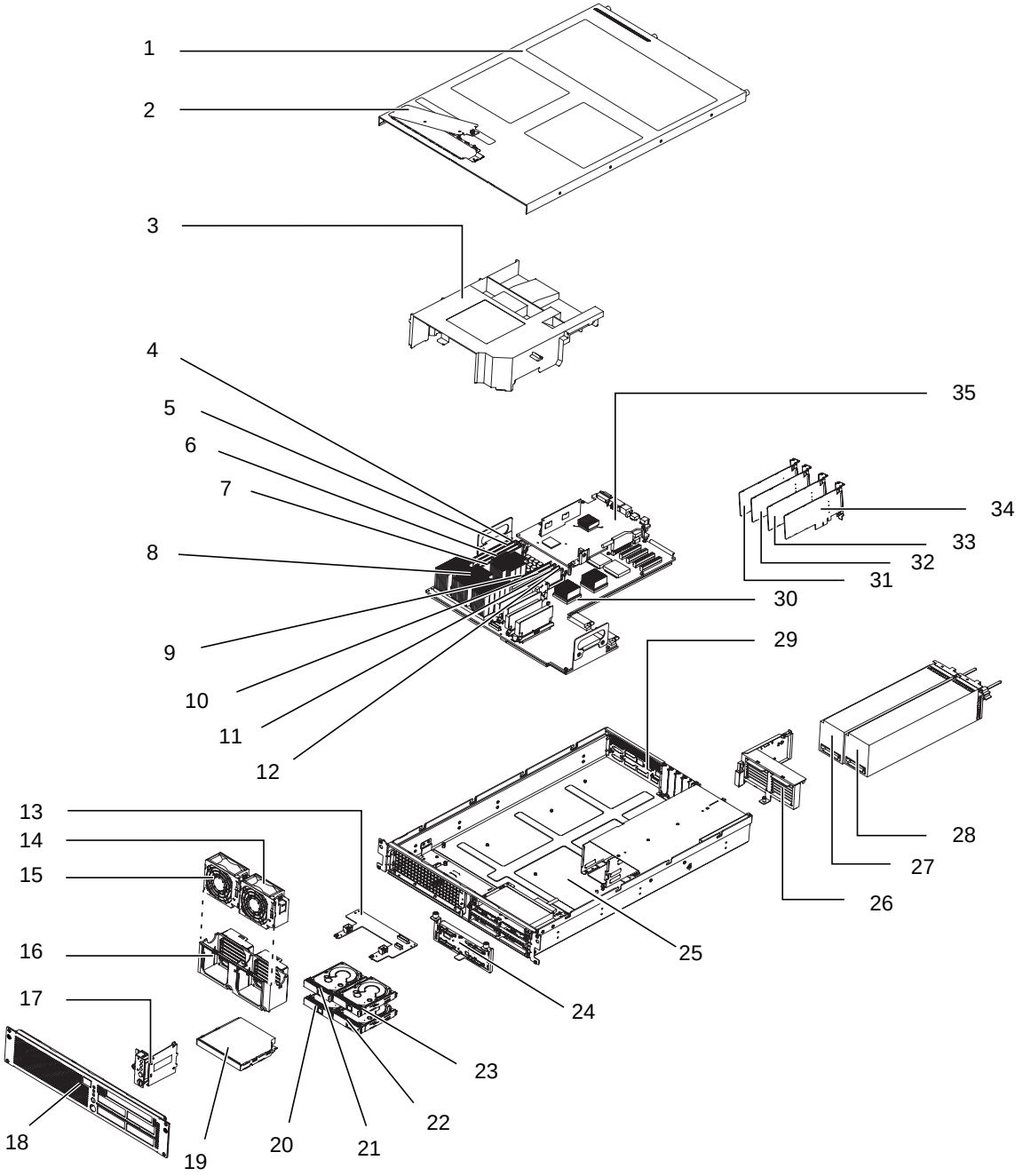
Components List

This appendix explains the server nomenclature and component numbering.

If multiple FRUs of the same type are mounted, the sign # and a sequential number are added to each of their names to differentiate between them.

FIGURE A-1 shows the locations of the M3000 server components.

FIGURE A-1 Location of Components



Location number	Component	Location number	Component
1	Top cover	19	CD-RW/DVD-RW drive unit (DVDU)
2	Fan cover	20	Hard disk drive (HDD#0)
3	Air duct	21	Hard disk drive (HDD#1)
4	Memory (MEM#00A)	22	Hard disk drive (HDD#2)
5	Memory (MEM#00B)	23	Hard disk drive (HDD#3)
6	Memory (MEM#01A)	24	Hard disk drive backplane (HDDBP#0)
7	Memory (MEM#01B)	25	Chassis
8	CPU (CPU#0)	26	Shutter unit
9	Memory (MEM#03B)	27	Power supply unit (PSU#0)
10	Memory (MEM#03A)	28	Power supply unit (PSU#1)
11	Memory (MEM#02B)	29	Rear panel
12	Memory (MEM#02A)	30	Motherboard unit (MBU_A, MBU_A_2, MBU_A_3, MBU_A_4)
13	Fan backplane (FANBP_B)	31	PCIe card (PCIe#0)
14	Fan unit (FAN_A#1)	32	PCIe card (PCIe#1)
15	Fan unit (FAN_A#0)	33	PCIe card (PCIe#2)
16	Fan cage	34	PCIe card (PCIe#3)
17	Operator panel (OPNL)	35	XSCF unit
18	Front panel		

APPENDIX **B**

FRU List

This appendix shows the FRUs of the M3000 server. The FRU list consists of the following items:

- Section B.1, "Server Overview" on page B-1
- Section B.2, "Motherboard Unit" on page B-2
- Section B.3, "Drive" on page B-5
- Section B.4, "Power Supply Unit" on page B-6
- Section B.5, "Fan Unit" on page B-7

B.1 Server Overview

TABLE B-1 lists the M3000 FRU components.

TABLE B-1 FRU components

Component	Redundant	Cold replacement	Hot replacement	Active replacement	Cold addition	Hot addition	Active addition
Motherboard unit (MBU_A, MBU_A_2, MBU_A_3, MBU_A_4)	No	Yes					
Memory (DIMM)	No	Yes			Yes		
PCIe card (PCIe)	No	Yes			Yes		
Hard disk drive (HDD)	Yes	Yes	Yes	Yes *	Yes	Yes	Yes
Hard disk drive backplane (HDDBP)	No	Yes					

TABLE B-1 FRU components *(Continued)*

Component	Redundant	Cold replacement	Hot replacement	Active replacement	Cold addition	Hot addition	Active addition
CD-RW/DVD-RW drive unit (DVDU)	No	Yes					
Power supply unit (PSU)	Yes	Yes	Yes	Yes			
Fan unit (FAN_A)	Yes	Yes	Yes	Yes			
Fan backplane (FANBP_B)	No	Yes					
Operator panel (OPNL)	No	Yes					

* ■ A redundant configuration is created with the hard disk drive only when the disk mirroring software is used.
■ If a hard disk drive is an unmirrored boot device, it must be replaced by using the cold replacement procedure. However, if a boot device can be disconnected by means of a Solaris OS function or disk mirroring software function, active replacement can also be performed. The procedure for disconnecting a hard disk drive varies depending on the software being used. For details, see the manuals for the relevant software.

B.2 Motherboard Unit

The motherboard unit is the main circuit board of the M3000 server. The following components connect to the motherboard unit.

- "Memory (DIMM)" on page B-3
- "PCIe Slot" on page B-3
- "CPU" on page B-4
- "XSCF Unit" on page B-4

Power is supplied from the power supply units to the motherboard unit. To remove and replace the motherboard unit, power off the server. The replacement work is performed from the top of the server.

Because the CPU and the XSCF unit are connected directly to the motherboard unit, neither of them can be replaced individually. There are two types of motherboard units for the M3000 server: the motherboard unit mounted with the CPU consisting of two-core processors and the motherboard unit mounted with the CPU consisting of four-core processors. When replacing a motherboard unit, the replacement unit must contain the same type of processor. For example, do not replace a motherboard unit that has two-core processors with one that contains four-core processors.

For the replacement procedure, see Chapter 6.

B.2.1 Memory (DIMM)

The motherboard unit, which includes an ASIC called a memory access controller (JSC-MAC) and provides memory access control, has eight memory slots. To remove or mount DIMMs, power off the server. TABLE B-2 shows DIMM specifications.

TABLE B-2 DIMM Specifications

Item	Description
Maximum number of DIMMs	8
Location	On the motherboard unit
Active replacement	No
Hot replacement	No
Cold replacement	Yes

The memory consists of eight DIMMs in units of four. The server uses DDR2 SDRAM memory that has the following functions:

- ECC error protection
- Recovery from a memory chip error

For the replacement procedure, see Chapter 7.

B.2.2 PCIe Slot

The M3000 server provides four PCIe slots. Up to four low-profile type PCIe slots can be mounted in these PCIe slots.

A PCIe slot has the following functions:

- Supports the eight-lane PCI Express bus.
- High-speed serial point-to-point interconnect
- Extends the PCI data transfer rate to twice the value of PCI-X.

TABLE B-3 PCIe slot specifications

Item	Description
Maximum number of PCIe cards	4
Location	Rear of the server

TABLE B-3 PCIe slot specifications *(Continued)*

Item	Description
Active replacement	No
Hot replacement	No
Cold replacement	Yes

For the replacement procedure, see Chapter 8.

B.2.3 CPU

The SPARC 64™ VII processor is mounted on the CPU. The SPARC64 VII processor has the following features:

- Design adopting chip multithreading (CMT), in which a CPU sequentially performs multiple processes
- CPU consisting of two-core or four-core processors
- SPARC instruction set architecture (ISA)
- Visual instruction set (VIS) extended instructions that accelerate processing of multimedia, networking, encryption, and Java™

TABLE B-4 shows the CPU specifications.

TABLE B-4 CPU Specifications

Item	Description
Maximum number of CPUs	1
Number of CPU cores	2 cores or 4 cores
Location	On the motherboard unit

Because the CPU is mounted on the motherboard unit, it cannot be replaced singly. For information on how to replace the motherboard unit, see Chapter 6.

B.2.4 XSCF Unit

The service processor set that operates and manages the server is mounted in the XSCF unit.

The XSCF unit diagnoses and starts the entire system, configures domains, and detects and reports errors.

The XSCF units provides the following functions by means of the XSCF firmware:

- Control and monitoring of the main unit hardware
- Monitoring of Solaris OS, power-on self-test (POST), and OpenBoot PROM
- Control and management of system administrator interfaces such as the maintenance terminal
- Control of device information
- Remote message output for various events

Because the XSCF unit is mounted on the motherboard unit, it cannot be replaced singly. For information on how to replace the motherboard unit, see Chapter 6.

B.3 Drive

The M3000 server consists of up to four hard disk drives and one CD-RW/DVD-RW drive unit.

B.3.1 Hard Disk Drive

TABLE B-5 shows hard disk drive specifications.

TABLE B-5 Hard Disk Drive Specifications

Item	Description
Number of hard disk drives	4
Interface	SAS
Location	Front of the server
Active replacement/active addition	Yes (only when software mirroring is used)
Hot replacement/hot addition	Yes
Cold replacement/cold addition	Yes

An SAS device has two data ports. Because each data port resides in a different SAS domain, this enables complete failover redundancy. If one path fails, communication is performed through the other independent path.

For the replacement procedure, see Chapter 9.

B.3.2 CD-RW/DVD-RW Drive Unit (DVDU)

TABLE B-6 shows CD-RW/DVD-RW drive unit specifications.

TABLE B-6 CD-RW/DVD-RW Drive Unit Specifications

Item	Description
Number of CD-RW/DVD-RW drive units	1
Interface	Advanced Technology Attachment Packet Interface (ATAPI)
Location	Above hard disk drive
Active replacement	No
Hot replacement	No
Cold replacement	Yes

For the replacement procedure, see Chapter 11.

B.4 Power Supply Unit

The power supply unit provides the server with power received from the external power source. The redundant configuration allows continued server operation if a power supply unit fails. TABLE B-7 shows the electrical specifications.

TABLE B-7 Electrical Specifications

Item	Specifications			
Frequency of CPU	2.52 GHz		2.75 GHz	
Input voltage	100-120 ACV	200-240 ACV	100-120 ACV	200-240 ACV
Number of power cords	2 (one for each power supply unit)			
Power cord length	3 m/9.84 ft			
Cooling fan unit	2 (1 for each power supply unit)			
Redundancy	1 + 1 redundant configuration			
Rated current*	4.80 A	2.59 A	5.15 A	2.81 A
Frequency	50/60 Hz			

TABLE B-7 Electrical Specifications *(Continued)*

Item	Specifications			
Maximum power consumption†	470 W	460 W	505 W	500 W
Apparent power†	480 VA	517 VA	515 VA	562 VA
Heat dissipation†	1,603.7 BTU/hr (1692 KJ/hr)	1,569.6 BTU/hr (1656 KJ/hr)	1,723.1 BTU/hr (1818 KJ/hr)	1,707.9 BTU/hr (1802 KJ/hr)
Power factor†	0.98	0.89	0.98	0.89
Active replacement	Yes			
Hot replacement	Yes			
Cold replacement	Yes			

* In a redundant configuration, the rated current per cable is half the value shown in TABLE B-8.

† This value applies to the full configuration.

For the replacement procedure, see Chapter 12.

B.5 Fan Unit

The fan units generate an airflow between the inside and outside of the server. If an error occurs in one fan unit, the XSCF detects the error and the normally operating fan unit starts rotating at a higher speed to cool the server. The M3000 server uses the fan units (FAN_A) as its main cooling system. TABLE B-8 shows the fan unit specifications.

TABLE B-8 Fan Unit Specifications

Item	Description
Number of fan units	2
Redundancy	2 units (1 + 1 redundant configuration)
Location	Front of the server
Active replacement	Yes
Hot replacement	Yes
Cold replacement	Yes

For the replacement procedure, see Chapter 13.

APPENDIX **C**

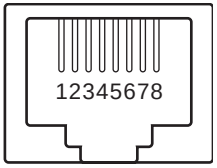
External Interface Specifications

This appendix explains the specifications of the external interface connectors provided on the M3000 server.

- Section C.1, “Serial Port” on page C-2
- Section C.2, “UPC Port” on page C-2
- Section C.3, “USB Port” on page C-3
- Section C.4, “SAS Port” on page C-3
- Section C.5, “Connection Diagram for Serial Cable” on page C-4

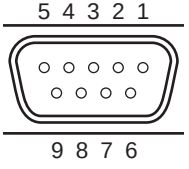
C.1 Serial Port

TABLE C-1 Serial Port

Pin assignment	Pin number	Signal name	Input/output	Description
	1	RTS	Output	Request to Send
	2	DTR	Output	Data Terminal Ready
	3	TXD	Output	Send Data
	4	GND	---	Ground
	5	GND	---	Ground
	6	RXD	Input	Receive Data
	7	DSR	Input	Data Set Ready
	8	CTS	Input	Clear to Send

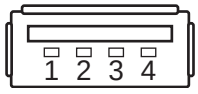
C.2 UPC Port

TABLE C-2 UPC Port

Pin assignment	Pin number	Signal name	Input/output	Description
	1	ER	---	---
	2	NC	---	Not connected
	3	NC	---	Not connected
	4	NC	---	Not connected
	5	SG	---	Ground
	6	*BPS	Input	UPS hardware error signal
	7	*BTL	Input	Battery end of discharge warning signal
	8	NC	---	Not connected
	9	*ACOFF	Input	Power failure detection signal

C.3 USB Port

TABLE C-3 USB Port

Pin assignment	Pin number	Signal name	Input/output	Description
	1	VBUS	Output	Power supply
	2	-DATA	Input/output	Data
	3	+DATA	Input/output	Data
	4	GND	---	Ground

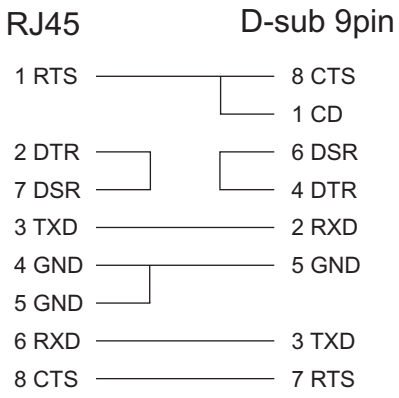
C.4 SAS Port

The SAS port connects the server to an external device, such as a tape drive, which has a SAS interface. For information on which devices can be connected, contact a service engineer.

Note – Even though the SAS port has four lanes, only two lanes can be used with this port.

C.5 Connection Diagram for Serial Cable

FIGURE C-1 Connection Diagram for Serial Cable



APPENDIX **D**

UPS Controller

This appendix explains the UPS controller (UPC) that controls the uninterruptible power supply (UPS) unit.

- Section D.1, “Overview” on page D-1
- Section D.2, “Signal Cable” on page D-2
- Section D.3, “Configuration of Signal Lines” on page D-3
- Section D.4, “Power Supply Conditions” on page D-4
- Section D.5, “UPS Cable” on page D-5
- Section D.6, “Connections” on page D-6

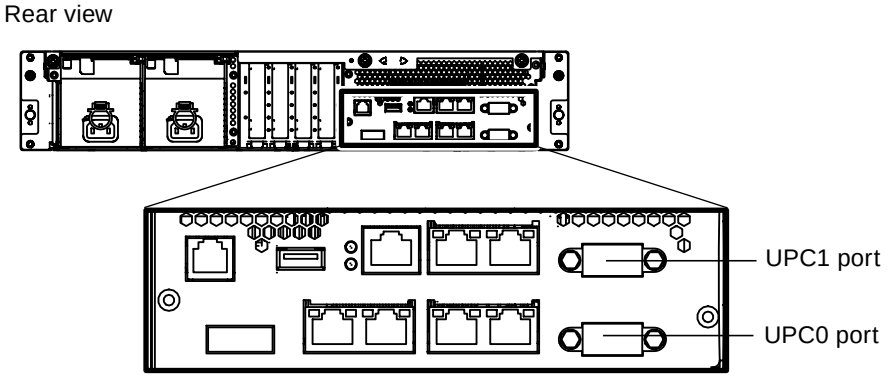
D.1 Overview

The UPS is a unit to ensure a stable supply of power to the system even in the event of a power supply failure or a massive blackout.

When the UPC port on the server is connected to the UPS signal cable that has a UPC interface, if the UPS detects a power failure, it notifies the server of the failure so that the server can perform emergency shutdown processing. This stops the server safely.

FIGURE D-1 shows the location of the UPC port on the M3000 server.

FIGURE D-1 UPC Port Locations



Note – The UPC port is supported only in the AC power supply model.

D.2 Signal Cable

Use the shielded pair cable with the following specifications.

- Direct current resistance (roundtrip/pair): 400 W/km or less
- Cable length: Up to 10 m (33 ft.)

D.3 Configuration of Signal Lines

This section provides the signal definitions.

FIGURE D-2 shows the configuration of signal lines when the UPS is connected.

FIGURE D-2 Connection Between the Server and UPS

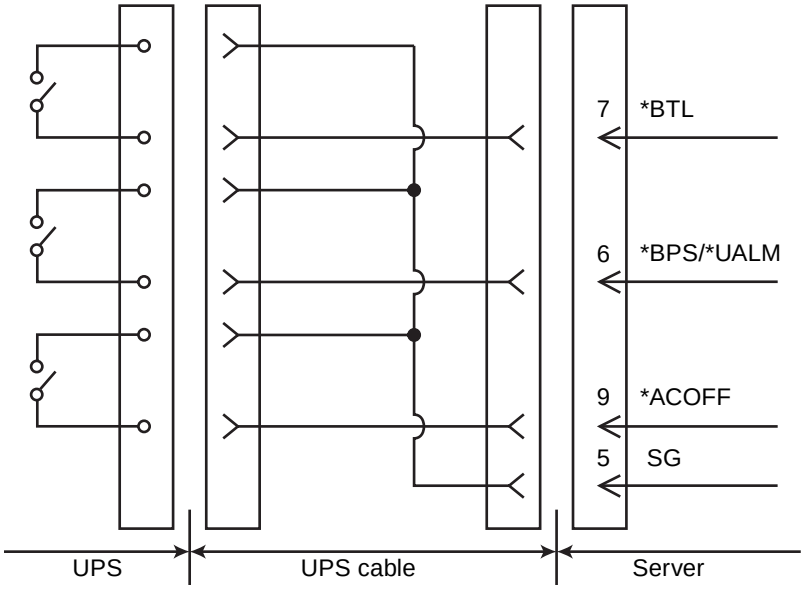


TABLE D-1 Signal Line Definitions

Signal name	Definitions	Pin number	Remarks
*BPS/*UALM	Indicates a UPS error.	6	Normal state: Off Abnormal state: On
*BTL	Indicates that the battery level of the UPS has decreased and warns that battery power will be unavailable after a certain period of time has elapsed.	7	Normal state: Off Abnormal warning: On (Note 1)

TABLE D-1 Signal Line Definitions *(Continued)*

Signal name	Definitions	Pin number	Remarks
*ACOFF	Indicates that a power failure has occurred in the commercial power supply connected to the UPS.	9	Normal state: Off Abnormal state: On (Note 2)
SG	Signal ground	5	
ER (Equipment Ready)	Indicates that the server is operating	1	Do not connect anything to this pin.

On: Indicates that the contact is closed.

Off: Indicates that the contact is open.

Note 1: Use a UPS that can normally supply power from the battery at least 10 to 60 seconds after *BTL is turned on.

Note 2: Use a UPS that can normally supply power from the battery within 2 seconds of a momentary commercial power interruption even if *ACOFF is not turned on.

D.4 Power Supply Conditions

TABLE D-2 and TABLE D-3 show the power supply conditions of the UPC interface.

D.4.1 Input Circuit

TABLE D-2 Input Power Supply Conditions

Signal name	Input conditions
*BPS/*UALM	No voltage relay contact
*BTL	Contact rating DC 12 V, 10 mA or greater (0.5 A maximum)
*ACOFF	Use of a gold-plated contact or reed relay is recommended.

Limit the signal line chattering period to 1 ms.

D.4.2 Output Circuit

TABLE D-3 Output Power Supply Conditions

Signal name	Output conditions		
ER	Output voltage	VOH	DC 3.1 V (minimum)
		VOL	DC 0 - 0.4 V (maximum)
	Output current	IOH	-4 mA (maximum)
		IOL	4 mA (maximum)

D.5 UPS Cable

The UPS cable specifications are as follows:

- Connector shape

  D-SUB9 pin male (receptacle side: female)

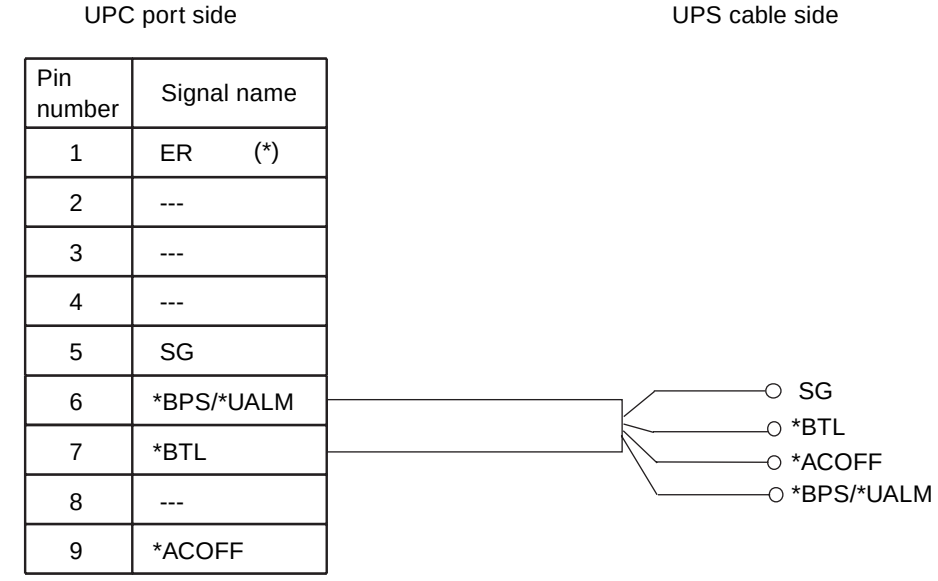
  DEU-9PF-F0

- Terminal array

  FIGURE D-3 shows the pin signals of the UPC port and UPS cable.

  Do not use any pin that is not defined (Pin 2, 3, 4, and 8 in FIGURE D-3). The pins on the cable side are as follows:

FIGURE D-3 Correspondence Between the UPC Ports and the UPS Cable Pins



*: Do not connect to the ER signal pin.

If a UPS cable is required, it must be prepared separately. For details, contact your sales representative.

D.6 Connections

This section explains the connection between the UPC port and UPS.

- UPC#0 connects to UPS#0, and UPC#1 connects to UPS#1.
- Single power feed uses only UPC#0.
- Dual power feed uses UPC#0 and UPC#1.

APPENDIX **E**

DC Power Supply Model

This appendix describes the requirements specific to the DC power supply model.

To use the DC power supply model, make sure to read this information.

- Section E.1, "The Server Views" on page E-2

  This is equivalent to Section 2.1, "Name of Each Part" on page 2-1. When using the DC power supply model, refer to the content described in this appendix.

- Section E.2, "LED Functions of Power Supply Unit" on page E-4

  This is equivalent to TABLE 2-5. When using the DC power supply model, refer to the content described in this appendix.

- Section E.3, "Electricals Specifications" on page E-5

  This is equivalent to TABLE B-7. When using the DC power supply model, refer to the content described in this appendix.

- Section E.4, "Using the `showhardconf` Command" on page E-6

  This is equivalent to Section 3.5.1, "Using the `showhardconf` Command" on page 3-11, Section 4.4.2, "Verifying the Hardware Operation" on page 4-10 and Section 4.5.4, "Verifying the Hardware Operation" on page 4-15. When using the DC power supply model, refer to the content described in this appendix.

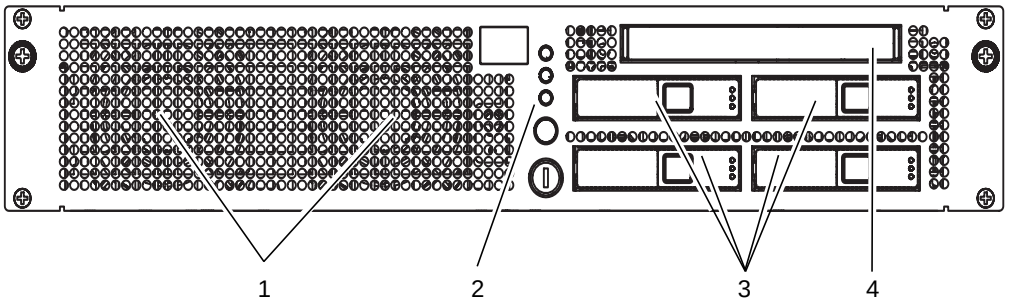
Note – The content not mentioned in this appendix is common to the AC power supply model and the DC power supply model. Refer to the description in each chapter.

E.1 The Server Views

This section describes the names of parts mounted on the DC power supply model.

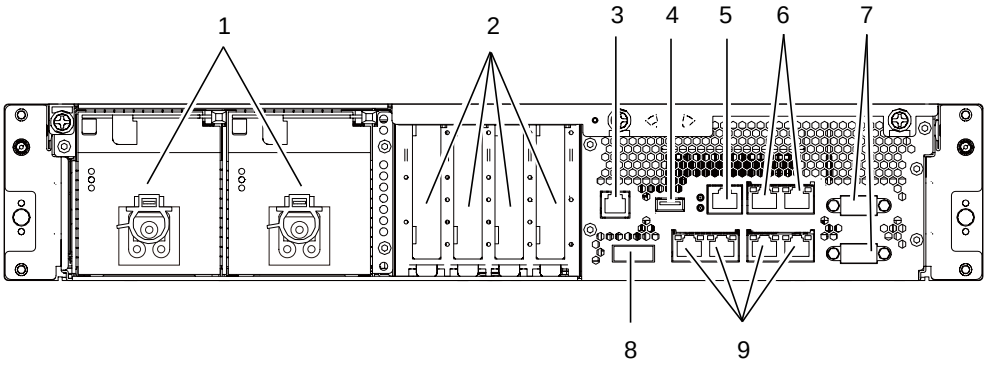
Note – This is equivalent to Section 2.1, "Name of Each Part" on page 2-1. When using the DC power supply model, refer to the content described in this appendix.

FIGURE E-1 Server (Front View)



Location No.	Component
1	Fan unit (FAN_A)
2	Operator panel (OPNL)
3	Hard disk drive (HDD) (2.5-inch SAS disk)
4	CD-RW/DVD-RW drive unit (DVDU)

FIGURE E-2 Rear View of the Server (DC Power Supply Model)



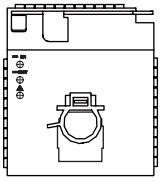
Location No.	Component	Maximum Number per Server
1	Power supply unit (PSU)	2
2	PCIe slot	4
3	RCI port	1
4	USB port (for XSCF)	1
5	Serial port (for XSCF)	1
6	LAN port (for XSCF)	2
7	UPC port	2
8	Serial Attached SCSI (SAS) port	1
9	Gigabit Ethernet (GbE) port (for OS)	4

E.2 LED Functions of Power Supply Unit

This section describes the LED names and their functions mounted on the power supply unit of the DC power supply model.

Note – This is equivalent to TABLE 2-5. When using the DC power supply model, refer to the content described in this appendix.

TABLE E-1 LED Functions of Power Supply Unit

Component	Name	Color	Description
Power supply unit (PSU) 	IN	On (green)	Indicates that input power is being supplied to the power supply unit.
		Off	Indicates that input power is not being supplied to the power supply unit.
	OUT	On (green)	Indicates that the power is on and being supplied.
		Off	Indicates that the power is stopped and is not being supplied.
	CHECK	On (amber)	Indicates that an error occurred in the PSU.
		Blinking (amber)	Indicates that the power supply unit is ready to be replaced.
		Off	Indicates that the PSU is in the normal state.

E.3 Electricals Specifications

This section describes the electrical specifications of the DC power supply model.

Note – This is equivalent to TABLE B-7. When using the DC power supply model, refer to the content described in this appendix.

TABLE E-2 Electrical Specifications

Item	Specifications	
Frequency of CPU	2.75 GHz	
Input voltage	-48 Vdc	-60 Vdc
Number of power cords	2 (one for each power supply unit)	
Power cord length	5 m/16.4 ft	
Redundancy	1 + 1 redundant configuration	
Rated current*	10.52 A	8.50 A
Maximum power consumption†	505 W	510 W
Heat dissipation†	1,723.1 BTU/hr (1818 KJ/hr)	1,740.2 BTU/hr (1836 KJ/hr)

* In a redundant configuration, the rated current per cable is half the value shown in TABLE E-2.

† This value applies to the full configuration.

E.4 Using the showhardconf Command

This section describes the showhardconf command on the DC power supply model.

Note – This is equivalent to Section 3.5.1, "Using the showhardconf Command" on page 3-11, Section 4.4.1, "FRU Removal and Replacement" on page 4-8 and Section 4.5.4, "Verifying the Hardware Operation" on page 4-15. When using the DC power supply model, refer to the content described in this appendix.

On the DC power supply model, the showhardconf command output for the CPU and the power supply unit section is as shown in the example below.

```
          + CPU Status:Normal;
              + Freq:2.750 GHz; Type:32;
              + Core:4; Strand:2;
                  .
                  .
      PSU#0 Status:Normal; Serial:EA09320015;
          + FRU-Part-Number:CA01022-0730 01A  /300-2278-01   ;
          + Power_Status:Off;
          + Type:DC;
      PSU#1 Status:Normal; Serial:EA09320016;
          + FRU-Part-Number:CA01022-0730 01A  /300-2278-01   ;
          + Power_Status:Off;
          + Type:DC;
```

For details, see the showhardconf command man pages.

Abbreviations

A

ASIC	Application-specific integrated circuit
AT	Advanced technology
ATAPI	AT attachment packet interface

B

BUI	Browser-based user interface

C

CH	Channel
CMP	Chip multi-processor
CMT	Chip multi-threading
CB	Circuit breaker
CLKU	Clock control unit
CLI	Command-line interface
CMU-CH	CMU channel
CE	Correctable error
CPU	Central processing unit

D

DCL	Domain component list
DDC	DC to DC converter
DE	Diagnosis engine
DID	Domain ID
DIMM	Dual inline memory module
DRAM	Dynamic random access memory

E

Ecache	External cache
ECC	Error correction code

F

FANBP	Fan backplane
FMA	Fault management architecture
FRU	Field-replaceable unit

G

GBps	Gigabyte per second
GHz	Gigahertz
GUI	Graphical user interface

H

HDD Hard disk drive

HDDBP Hard disk drive backplane

I

I2C bus Inter integrated circuit bus

ISA Instruction set architecture

IOBP I/O backplane

L

LCD Liquid crystal display

LED Light emitting diode

LSB Logical system board

LSI Large scale integration

M

MAC Media access control address

MBC Maintenance bus controller

MEM Memory modules

MBU Motherboard unit

N

NTP Network time protocol

NVRAM Non-volatile random access memory

O

OPNL Operator panel

OS Operating system

P

PCIe PCI express

POST Power-on self-test

POR Power-on reset

PSB Physical system board

PSU Power supply unit

R

PROM Programmable read-only memory

RAM Random access memory

S

SAS Serial attached SCSI

SATA Serial ATA

SRAM Static RAM

SC System controller

T

TC Throughput computing

TOD Time of day

U

UE Uncorrectable error

UPC UPS controller

UPS Uninterruptible Power Supply

X

XCP XCSF control package

XIR Externally initiated reset

XSB eXtended system board

XSCF eXtended System Control Facility

XSCFU eXtended system control facility unit

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